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YOUR COMMODORE

THIS MONTH'S PROGRAMME

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55 Printer Repair
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52 Moonwalker
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53 Casino
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And the multi-points
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Full of lovely letters

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Take heed all broken out
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14 Award of Arcadia
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Ganonwing.

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We are the dangerous
brothers.

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17 New Zealand Story
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not going to be a genuine
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21 APB
What are you going to do
with that truckload
yellow?

YOUR PROGRAMMER

Read this programme about
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Phone Show Goodies

The magic of Christmas bells will come early this year as the tale as the Personal Computer Show ring in the new year. Fans will no doubt be quaking the boots of the programmers and managers throughout the country as the 27th of September drenches a snowdrift.

Although there are always a few surprises which are kept under wraps until the last minute, a few surprises are known to the press to what the speaker. So far, Freymont is facing no obstacle to carry off the award as the most prolific author of books of the decade. The company has lined up no less than 45 new releases for launch over the next seven months.

Father assumed these have been intercepted by the Pandora team and beamed into a 16 ft test called *Progeny Xenomorph*. Also from the Interceptor Group, the low price label, *Premiere Budget*, debuts its latest Joe Black one.

There's always an international flavor to the show, and high quality software is the latest Spanish resort. Micrograid Soft is launching Dinamo's PC version of *Nave*. *Nave* plus those new tables, *Grand Prix*, *Nave*.



SPEAKETH...

On Sunday 27th August 1938 I was invited to participate in the computer industry event of the year. Granddads Entertainment had hired Lorne Town's football ground for the day, and with a charity soccer tournament in aid of the *Halldorburgh* (read: and the baby care unit at Liverpool Maternity Hospital)

Hoodless to say that although the graduation came turn-around on the day, due to a rather startling penalty shown-out, both Paul Kavanagh and myself thoroughly enjoyed our day out and we look forward to competing next year. Apparently over 25,000 were raised on the day and congratulations must go to Stephen Hall of Urmston and everybody else involved in the organisation for making it a successful venture.

That brings me nicely to the subject of football related games. Although we shall be exploring these in much greater detail in a later issue, I just find it quite startling that this year no more licensed soccer games are being released!

There's the Liverpool, Arsenal and Spurs and Germany games from Channel 4, Czech's Super Soccer from Encore, Manchester United from Kix, and Super League from from Andromeda (being programmed with advice from Les Howard). As soon as Vicky Bonser's famous comment can be heard will be complete.

It works with any smartphone, tablet, laptop, PC and doesn't let your documents slip.

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

Star Performance

Stue has extended its range of LC series printers with the addition of three AJ landscape format machines, now sporting a bottom feeder (Can we say that is not *new*?)

The LC-45 is a wide carriage (76.5 inches) version of the fast, new LC-10 II. Both machines are developments of the phenomenally successful LC-10 but now with go faster targets added to their performance (4300 in M/G). The LC-45 is the one which is also available as a bottom feed.

new Freddy Harsden adventure called *South of Manhattan*, and *After the War* a post nuclear holocaust entertainment.

Andrew Harrison will be looking for a better Show this year after being diverted by his new programming on the eve of last year's exhibition. Amazing the games on preview this year is *Scorcher*, John Philips follow up to *Minemaster* and *Nebula*.

CDS has stooped to appealing to the lowest common denominator with a range of games from US-based Activision recently dubbed as 'adult software', the first two games are *Song Maker* and *Castlefield Square*. What's wrong with these kids who get their jollies from degraded dollsies.

Masthead's new games comprise *Scorcher V*, *Harlequin*, *Devolution*, *Paradise Parole* and *Life on Death*. The latter is a blood and guts operation which places the computer's electronic knife into the player's hands - should he be right, well for high lives but it may cost you an arm and a leg.

Touchline: The Personal Computer Show, Earls Court, London 27 September to October (Trade only 28-29 September)

version. Similarly the LC24-15 is a wider, faster version of the LC24-10.

Although Star Macintosh clones on LC series printers, as low-cost, business machines the range is considerably suitable for home use. The prices start at £199 for the LC-10, £299 for the LC-10 II and LC24-10, £299 for the LC-10 colour version and rise to £399 and £499 for the LC-15 and LC24-15 respectively.

Touchline: Star Macintosh IIx, Crown House 49, Drovebridge Road, Ealing, London W5 1BS Tel: 01-860 3550

Art of Tea-leafing

It's difficult to understand what someone is saying when their tongue is placed firmly in their cheek, however, we understand that *Blasphemy: Art's Reef* the Play! promises to steal the Show this September.

Designed for Amiga and PC users who find *The Lord a Tale* too serious and serious, Reef has his first planted friends on the ground as he creeps around Tin-city looking for a fire take-away. Having come ready to Reef to be searched for the six pieces of the magic stone which will make him the new God King of Tin.

— First, Reef must find the



Keep the thief, meet the Dead, Run the Fox, and Paul the Fox

scrolls which form a spell book. So, when there's magic about you know that Reef's got the scrolls - he maybe he always walks like that.

Reef's Tale fans can take Art with the latest EA tin-tin roleplaying adventure, *Secrets of Thought* (Amiga only). Written by Freefall Associates, authors of the excellent *Archon*, the idea is to beat the long twilight out of the guardians of the



area enchanted woods and thereby dispell the evil. She downloads who have subjugated the neighbouring kingdom. As is life, the characters have memories so be nice to the people on the way up - you're bound to meet them again on the way down.

Touchline: Electronic Arts Limited, Business Centre 11-49 Station Road, Loughborough, Leicestershire, LE11 3PW Tel: 05373 49440

Winter Draws On

Jim Ribben says to take the brunt with a pools predictor program at the unbelievably low price of £2.99.

System 2 - The Pools Predictor is a dedicated database which the user gradually builds up as each result is announced. The program then takes the data and predicts the likely outcome of future matches in all four English and three Scottish leagues.

Hang on a minute, if hundreds of people buy the software and all enter the same data week after week, surely the prediction will be



the same for everyone and won't then reduce the share of any money? Personally, we'll stick to our lucky pen

System 2 is available for C64, C16, Plus II, Amstrad CPC, Atari BBC/Electron and MSX (ref:8)

Video Rentals

You've read the magazine reviews, seen the advertising, now you can hire the video. It's a rather interesting movie Action. Screenplay is top-quality rental versions of its publicity video of the latest games releases to computer stores and video libraries.

Now hand-held games edition will be able to hold to the latest game demo with the added benefit of a video magazine feature. In

the comfort of their living room, The magazine has more than met and some of interest to computer games fan all for a mere £1.95 a rental charge.



Touchline: Not That Serious, 167 Brompton Road, Colchester Essex CO4 3AE Tel: (0206) 754217



Yo Gazza what's the score

Paul Gascoigne, the crown prince of soccer, has signed up to a new team. But if you are the Spurs fan don't worry, he is not leaving Tottenham, instead Gazza has signed up for Europe Software and will star in Gazza's Super Soccer.

The game is due for release in October on Amiga and C64 and, if you believe the hype, carries more features than there are colours in a Matt bar. Top of the list is the "Boost-meter". This gives the player total control of the kick he is about to play, height, strength or spin.

The pitch view will be different. With a number of variants depending on the position of the ball, though Europe say "it will work



well".

What if the Spurs fan does not own a computer? Fortunately the game can be set for most of the 92 league sides and Scottish Premier Teams. Although I am sure it would be easier to play

with Gazza, then against (unless your name is Gary Lineker).

If the game has any of the personality of the Mar. Mar Keltie should do well and may even top the league unlike Gazza's other team

Going for Gold

It's all systems Go for a trip to Taiwan for Switzerland's Anders Kennel, the winner of the first Amiga Computer Olympiad which was held on 19 August at London's Park Lane Hotel. All Kennel had to do to win was to program the most challenging version of the popular animal game of Go.

Each year Anders spends on the world's computer Go championship in Taipei, Taiwan and the Olympiad was deemed partly as a qualification for the event. Co-ordinated and organised by David Levy, an international Chess Master, the Olympiad also covers entries for other events such as Chess, Go, Bridge and Table Tennis and this debut attracted 13 programs from 17 countries.

In the Olympiad, programs compete against each other in a knock out play, battle to the death and the winners are awarded the money in each category. In the 1989 Go event the competition was expected to be stiff because the prize meant a trip to compete in the world final, the winner of which can win his program space. The skills of a human expert. If the game wins, the programmer stands to claim a \$1 million prize as Kennel stands to gain a lot with his Swiss Explorer program.

Any companies or individuals who think they can beat the world's experts can get further details from David Levy at the address below. The 1990 Amiga Computer Olympiad will be held at the same London venue from between 1 August and 14 August 1990.

Teacher/David Levy
11 London Road, London
NW6 6LP. Tel 01-224 5712.

Star Wars Trio

Danmark is releasing its three games based on the Star Wars films. The Star Wars Trilogy packs in the clone-on-clone Star Wars: The Empire Strikes Back and Return of the Jedi for the Amiga (£24.99), Commodore 64/Amstrad (£12.99) and C64 disk (£14.99).

Now from Danmark, the

best computer version of Targem's clone-on-clone game. Hard Drive's from US company Brotherhood names StarSparks Café and its hockey extravaganza against some hot alien competition and Pantheon, an action-adventure graphic design which breaks Danmark into the unity program field.

Hard Drive's will be

available on November 25 for the Amiga at £14.99, PC at £14.99 and for the C64 for £9.99 (mass) and £12.99 (disk). Pantheon is already in the shops but only for the Amiga and PC. (£19.99).

Teacher/Danmark,
Ferry House 11/17 Low
Road, London SW15 1PR
Tel 01-758 2222.

Dungeons & Drag On

A year after the launch of the C64 and PC versions of the Advanced Dungeons & Dragons epic *Pools of Darkness* US Gold's 528 developers has promised that the game will appear for the Amiga before Christmas - do they mean Christmas 1989, they surely do? So what's the release date? Danm?

However, when the release date actually arrives, US Gold promises that the third enhanced A/D&D game, *Melgar*, will be released one week later.

At? But what about the second game? On this the

company is almost more specific. *Dropout of Flame* will be appearing in late October for the PC and Amiga (£24.99) and in late November for the C64

(£14.99/disk, £9.99/cassette).

We look forward to the web anticipation but we're not holding our breath. Until then *Merces of the Lancer* will suffice.



CURSE OF THE AZURE BONDS

by David Huxford and Michael Huxford

Reviewed by David Huxford and Michael Huxford

Available on IBM PC compatible, Commodore 64,

and Amiga computers. Price \$29.99.

published by New Line Software.

SSI - PC \$29.99, C64 Disk £24.99

CURSE of the Azure Bonds promises the most dramatic and colorful quest ever the dark forests at the city of Pelham. Now with a party of five, you'll be led to the distant lands you'll find in a quest made for any thing. Underestimated, or not, being a treasure collector, every corner you visit in the city of Pelham is full of treasure. All traps and monsters in gold, and it's not just the five blue symbols that make the quest of a quest. Being a treasure collector, every corner you visit in the city of Pelham is full of treasure. All traps and monsters in gold, and it's not just the five blue symbols that make the quest of a quest. Being a treasure collector, every corner you visit in the city of Pelham is full of treasure. All traps and monsters in gold, and it's not just the five blue symbols that make the quest of a quest.

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Adventure Begins your Quest, beginning this game's first chapter.



GEMINI WING

Virgin - £9.99 Tape, £14.99 Disk

The ultimate in gutter press has started an intergalactic war with its jingoistic outpourings. Now you have to save the day.

This game features perhaps the worst scenario in the history of computer games. It is both unlikely and unrealistic and shows no regard for the laws of physics, logic or common sense. Unfortunately, it's the best part of an otherwise forgettable game.

The scenario centres around an Earth newspaper known as the *Sunday Sport* (I wonder what that could be?) and its silly stories about alien farming girlfriends into potatoes and so on. According to Virgin (and its friends and allies) the alien in question and when the *Sunday Sport* went too far with the leading "Do Mutant Alien Stars" the entire forces of every planet in the galaxy arrived to destroy the Earth. But wait! Is it a bird, is it a plane? No, it's you. Armed with only a single laser Gemini fighter you take off to destroy everything else in the galaxy to save the day and stick up a high score. Oh yeah? You have a much chance of hurting fog or landing England in victory in a Test series.

This takes you to the game itself which would be reasonable in a £19.99 budget

release but not as a full priced game. It's yet another about the alien to collect extra weapons etc. of game. This apparently was caused by a "strange paradox in the future of reality" which probably also explains how Virgin can follow-up a cleaner like *Billboard* with a game like this.

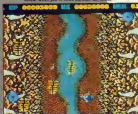
Tony Hollingsworth

INFO

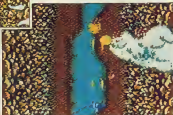
Gameplay: 12%
Graphics: 25%
Sound: 18%
Usability: 10%
Overall:
21%

*Back in the days of computer news Virgin created a game or had a games thing called *Overline*. It was based on cricket. Unfortunately to change the name of a paper, you had to break into the programme and change the code!*

Below: When you're killed the fish-like alien



Right: It's time to fill enemy scores (like the alien)



CITADEL

Activision - £9.99 Tape, £14.95 Disc

All was quiet, all was still. Darkness prevailed and neither good nor evil was present; until the monitor probes moved in to investigate an unknown power source.

For a time, nothing happened in the dark dank recesses of an underground complex on a distant planet. There was no light and no sound, and nothing moved.

You had anything thoughts of moving for quite some time, but they were still charged up and high above the planets surface, a probe was watching, listening, monitoring and undetected power source.

But the planet lay dormant. Nothing moved upon it's surface, no flash fire and no flash swam in the area, and yet, an electrical force was being detected.

Following the data back to base, the probe was replaced by a transporter ship which landed first directly upon the surface. Then set about finding the power and eventually traced it to a subterranean city.

Every underground, the probe began transmitting pictures of it's surroundings and random tactical control for you to maneuver it around the maze of corridors which have surrounded themselves.

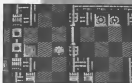
Caution is the only approach in an unknown surrounding and if you do not observe that, you will lose probe like an ether on a hot day. As you near certain areas of floor, they open and gas starts appear and open fire. Others open

and emit mobile death machines which roam around the maze and latch onto your trail. Following you they will launch projectiles at your probe and can seriously damage it's vision.

However, the design of these mobile robots has one major flaw in it, they are easily re-programmed using a standard code. Without this key, your probe can issue instructions to the robots which causes a change of heart and they rebel against their creator and protect you. Once re-programming is complete, they will still follow but they will get in your way and act as a hindrance. However, squabbling will break out if you decide to have more than one hero-agent robot following in your footsteps. Newcomers will run into the back of those already established and cause them to explode.

There are various levels to navigate and each one contains a different breed of robots. Some seem to be answer placed and require more time to destroy, others seem to be able to bring off the new programming and turn against you once more. And the dangerous bit is that you can't tell when they have lost their friendship.

Your energy level depletes as you come into contact with the energy of



Above: A wanderer looks on a small nearby droid.



Above: And now an entirely square is in Mr Small Monitor View.

their fire but there are bunkers which contain energy and fuel. Pinned around the maze rules on your travels you will find weapon pods which modify your detectors. It's difficult to see how long to level and transportation slip you from city to city.

Ultra-smooth scrolling, great sound effects and decent graphics make Citadel one of the most playable games in quite some time. It's deemed addictive and the best part is that it's not just a shoot-'em-up and requires a few pieces of mind and some strategy thinking to get to the end. To Activision also have to say it "please produce some more decent games like this".

Andrew Barker

Citadel is from Electronic Dreams - An producer of such success as Super Sprint and The Incredible Shrinking Sphere. Marked by Activision who have a recent track record of poor quality games. Citadel comes as a pleasant change.

INFO

Gameplay: 82%

Graphics: 76%

Sound: 83%

Usability: 84%

Overall:

84%

SWORD OF ARAGON

SSI (US Gold) - £29.99

Roleplaying, politics and war are all part of this fantasy epic.



The Duke of Aladith has died leaving you, his son, to your destiny. A destiny that demands for you to lead your people against the evil and poison hordes and into battle with your enemies to the East. Only when you are liberator and leader of all Aragon will you fulfil your father's will.

Your first decision may be your most difficult as you must choose a character class to be throughout the game. You can be a great Warrior, Knight, Ranger, Priest or Mage - the last three making up their lack of fighting strength with magic.

Your choice of class also affects the type of army you will raise as, for example, a Warrior can build infantry for half the cost of others.

Money plays an important part of the game as you must manage your city's affairs by taxing the rates and choosing between raising an army or developing trade and industry. Both have their priorities since you need an army to defend your city and expand, but you need resources to

develop, train and pay for it. You also have to remember that the townsfolk may not like paying taxes at 80% and may strike, leave or rebel, supporting your chances of victory.

As Duke you must prove yourself as a leader and a statesman by dealing with envoys from other towns and resolving local disputes that can have an effect on your people's health, morale and loyalty. There is even effect your costume and the upkeep or expansion of your army.

Each turn represents a month of time in which you must manage your resources, defend your territory and expand to liberate the land. Which will inevitably lead to battles. When a battle erupts you must organise your forces for the fight. Obviously, your tactics will vary depending on the opposition you face and the terrain you have at your disposal. Personally, I favour hordes that can weaken an opponent before a sudden you. Where they can be crushed by steady charges or by infantry armed with

swords, javelins or spears.

Priests, Mages and Rangers should be kept safe behind the line when they can use their magic to greater effect. (Although you represent one class you can hire members of the others to supplement your army.) Unlike other SSI games where magic users can lightning bolts and hail fireballs the magic in this game is more subtle. These spells effect the movement and fighting ability of friend and foe by changing the terrain or showing an advance. Stamina can be restored or drained and arrows can be healed, confused, corrupted or teleported.

As the battle commences a turn (up to a maximum of 25) victory points are awarded for losses inflicted and territory gained, which finally decide the outcome of the battle. A loss will cause a drop in morale and loyalty but a great win will bring plundered gold, new recruits for your army and experience for your troops. After a few battles these points will amount to form increases in levels which will bring more

spells to your magic users and better fighting skills to your units. For example, level 4 mounted bowmen cause more damage with every attack than level 1, 2 or 3.

The result is a fascinating game in which you gradually exploit the resources and forces that you have and learn how to use them to expand your empire. The incredibly high technology factor is well earned as it's the style of game that you actually enjoy the most your play. Starting with a lost period when you're not quite sure what you're doing you gain military and character experience which sends you back for more and more. I'm afraid I'm not going to get much sleep until Aragon is free and I've earned the 800 points needed to complete the game.

Wally Hetherington

SSI is the company that took the headlines with the Dune game and Dragon's Lair. Games like this show with a few the company

INFO

Gameplay: 85%

Graphics: 56%

Sound: N/A

Lastability: 95%

Overall:

91%



Above: I bet Benny is now about choosing the camp option.

INFORMATION

April 11, 878 A.D.

A group of a hundred has returned to their home. All the other soldiers in his command. They are all now in the camp. The remaining 100 soldiers are in the camp and are being led by the command.

MORRIS: Perfection

April 11, 878 A.D.

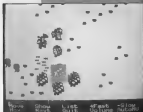
An army of 1000 men, ready to a battle with a group of 1000 men.

MORRIS: Perfection

Everything 1000 GP up to 1000 GP.

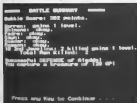
Press any Key to Continue . . .

Above: There's nothing really as satisfying as a page full of text.



Above: I've got a great idea guys. Let's all have that big square!

Below: More text I like it Miss!



Below: The super-squads The 1000-1000 of John





RICK DANGEROUS

Above: Here where a trap! (Taps)
Design?

Explore the temples and avoid the traps, but will there be a chocolate orange for you at the end?

Firebird - £9.99 Taps, £14.99 Disk



Above: Not Rick, that's dangerous!

INFO

Gameplay: 65%
Graphics: 60%
Sound: 50%
Lastability: 45%

Overall:

55%

They say that there is nothing new under the sun, everything is a derivative of something else. To exemplify this, the same system of computer games. Perhaps, Jason game, Rick Dangerous shows different signs of a common ancestry with selected platform games of many years ago.

Get acquainted here, part time as player, part time as creator and whole

time good guy has been on the trail of a long lost South American tribe for many a long year. By a strange coincidence, when his plane runs out of fuel over the jungle, he just happens to land at the entrance to the very Aztec temple he was searching for.

Getting is proved to a trap. Getting out is the other end was decidedly more problematical. He soon had the door slammed behind him when a huge door ball starts to roll back down the passage. With no time to change your name from Rick Dangerous to Rick Mena (because as we all know, a rolling stone gathers no Moss!) cilia ha, very droll, ties an web with - Dangerous Rick! your only option is to throw yourself off the cliff at the end of the tunnel. Surprised, gravity works in South American too and the ball follows you.

Having eventually dodged out of the way of the overgrown comical marble, all you have to do now is carefully avoid a series of angry natives, a few snakes and bats, lots of poisonous

spiders and a whole load of spears shooting out the walls, before you finally reach the other end. Then you can try your hand at those other scenarios including a night's fortress and an Egyptian tomb.

In order to defend yourself, you can pick things with your stick. Traps are all important here and I found the technique useful only against bats. Natives are best dispatched with a swift bullet but you only carry a few of those and the more they make it all too likely to set off a trap. You will also need dynamite to blast your way past rock falls and the like.

The trouble with this game is the lack of variety. Problems are usually only solved by trial and error, you frequently have to throw yourself into the unknown. Once you have solved that part of the game though, it is unlikely to cause you further stress and soon becomes repetitive. Fun and simple to play, I would suggest that it is a completed masterpiece. It would make a very good budget game.

Carson Hamilton

NEW ZEALAND STORY



Your chance to become a fully paid up member of the Antipodean rescue service.

Queen - £9.99 Tape

On the face of it, kiwis are something of a failure. New Zealand's most famous bird, they are totally incapable of flight, not very good at swimming and pretty ugly to boot. They do have one redeeming quality though, they are extremely loyal. So when 30 of Mike Kiwi's friends are captured by a psychotic minkie, he doesn't hesitate. Armed only with his bow and arrow, he sets off to rescue his friends before they experience a minkie's digestive system from the inside.

The game is a variation on the old ladder and platform theme, but is none the worse for that, having been skillfully converted from the arcade original.

You must reach all of your friends within a certain time allowance. A radar

shows your relative location and, on the early screens, there are a few helpful arrows to point you in the right direction. Although you only have your bow and arrow to defend yourself with, shooting some of the enemy will force them to drop other, more potent weapons - bombs, bouncing missiles and pots of oil. Temporary invulnerability being examples. Collecting from scores bonus points and if you manage to pick up all the boxes of the word 'rescue', you are granted an extra life.

Malicious - bunnies, bouncing thorns, evil frogs and vampire bats will all impede your progress and there are also some very large guardian creatures that have to be defeated, not always by orthodox means - the only way to escape

from the whole is to allow yourself to be captured first. You are then caught up handily in a shower.

As well as travelling on land, you will also need to take to the air. A already mentioned, though, kiwi wings are not equipped for this purpose so you will need to equip a balloon to help you. You will also need to watch your energy levels when swimming, underwater breathing is required for your health!

New Zealand Story is very well presented and is one of those rare games that although simple to play and easy to get into, is highly addictive. Above all, it is a good fun which when it comes down to it, is what a good game is all about.

Gordon Hamilton

Before I found out about my friends...



Below: If you need a new look, buy the book. Two months later we'll send you the kit!

INFO

Gameplay: 95%
Graphics: 75%
Sound: 65%
Longevity: 85%
Overall

80%

The Soccer Squad

Now that the new football season is well under way, the software charts are dominated by football games. Gremlin has fielded a team of four experienced players as its challenge for the top.



Gremlin Graphics - £9.99 Tape

Four games for the price of one is always worth a look as it often offers great value for money. This one bundles together Gremlin's football games starring two of the top names in football, Gary Lineker and Roy of the Rovers. However, before you think that all football games are the same, check-out these as each one offers an unique challenge.

Gary Lineker's Superstar Soccer is the traditional style of football game with a scrolling side on view of the pitch and joystick controlled players. In the game you can take control of the centre forward, goalkeeper and manager - as which you can push your team from a squad of players and decide team tactics by telling forwards to shoot or pass, and defence to either stay back or support the forwards. Perhaps the best part of the game is that the forwards don't just shoot at goal willy nilly they can also attempt spectacular goal attempts with headers and overhead kicks if the ball's at the right height.

Gary Lineker's Superstar is a selection of training exercises, that includes game training (such as perhaps and equal thirds), field work (including dribbling, shooting and shooting and ball control - where you must keep the ball off the ground by bouncing it off various parts of your team).

Roy of the Rovers is a curious mix of football action and arcade adventure, as some intergalactic gang has kidnapped the Wolverhampton team just before a big exhibition game that could save the club from

the developer's creditors. In a race against time you must avoid enemy rappers, hoodlums, traps and umbrellas and find the other four players, otherwise you will have to face the appearance alone.

The fourth game is the upcoming Footballer of the Year which plays like a board game and casts you as a 17 year old just starting football. Through taking the limited training classes that fall your way in action sequences you will earn money and be spotted by scouts from other teams, gradually taking you from fourth division obscurity to first division and international football, and perhaps the ultimate accolade as the Footballer of the Year.

Although together they represent a good footballing package they are at best, 2nd division games as they lack the quality and depth of the top of the game. Tony Rothwell

Gremlin Graphics has now moved out of the US Gold stable and back to Sheffield and independence.



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Apple II IZ	534.95	27.2
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Apple II JE	544.95	27.7
Apple II JF	546.95	27.8
Apple II JG	548.95	27.9
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Apple II JI	552.95	28.1
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Apple II JU	576.95	29.3
Apple II JV	578.95	29.4
Apple II JW	580.95	29.5
Apple II JX	582.95	29.6
Apple II JY	584.95	29.7
Apple II JZ	586.95	29.8
Apple II KA	588.95	29.9
Apple II KB	590.95	30.0
Apple II KC	592.95	30.1
Apple II KD	594.95	30.2
Apple II KE	596.95	30.3
Apple II KF	598.95	30.4
Apple II KG	600.95	30.5
Apple II KH	602.95	30.6
Apple II KI	604.95	30.7
Apple II KJ	606.95	30.8
Apple II KK	608.95	30.9
Apple II KL	610.95	31.0
Apple II KM	612.95	31.1
Apple II KN	614.95	31.2
Apple II KO	616.95	31.3
Apple II KP	618.95	31.4
Apple II KQ	620.95	31.5
Apple II KR	622.95	31.6
Apple II KS	624.95	31.7
Apple II KT	626.95	31.8
Apple II KU	628.95	31.9
Apple II KV	630.95	32.0
Apple II KW	632.95	32.1
Apple II KX	634.95	32.2
Apple II KY	636.95	32.3
Apple II KZ	638.95	32.4
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Apple II LC	644.95	32.7
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Apple II LF	650.95	33.0
Apple II LG	652.95	33.1
Apple II LH	654.95	33.2
Apple II LI	656.95	33.3
Apple II LJ	658.95	33.4
Apple II LK	660.95	33.5
Apple II LL	662.95	33.6
Apple II LM	664.95	33.7
Apple II LN	666.95	33.8
Apple II LO	668.95	33.9
Apple II LP	670.95	34.0
Apple II LQ	672.95	34.1
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Apple II LS	676.95	34.3
Apple II LT	678.95	34.4
Apple II LU	680.95	34.5
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Apple II LY	688.95	34.9
Apple II LZ	690.95	35.0
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Apple II MF	702.95	35.6
Apple II MG	704.95	35.7
Apple II MH	706.95	35.8
Apple II MI	708.95	35.9
Apple II MJ	710.95	36.0
Apple II MK	712.95	36.1

XYBOTS



Above: Xybots! There's a robot waiting to slip off! Below:

Enter the heroes, two hatch commands. They're characters who vibrate back to victory as though suffering from the side effects of a grade A vibration.

Despite the robot-like, a little that humans are meant, if a little flawed. As they move through the maze complex of the Xybots three progress is shown as small colour-coded sections of the screen. This leads to the two player games of the name. Although it makes a game up and to let two players to play simultaneously, the box of playing

area often spoils the gameplay. And when ready to the screen is taken up with stars and a map, things become a little ridiculous. The only advantage in the game when playing with two players is the ability to shoot back into the back and the combined firepower.

The Xybots are a mechanical race and not inclined to the usual formation of the heroic figure body. This means they can move a lot faster, they were among and past, even as much as each other down there. Despite the advantage and your rapidly descending power

Domark - £9.99/£12.99

A mechanical menace in the form of the Xybots is besieging the Earth. All that stands between them and victory are two wedding heroes.

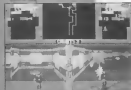
supply you still manage to slaughter the hucksters. This could possibly be due to the weapons picked up here and there as your travels. Coins can be collected for later purchase of mappers and extra firepower. Energy capsules to keep the body functioning and a host of gadgets to boost your character's abilities.

On level one a little ingenuity is rewarded with the discovery of a teleport that takes you directly to level eight. Not only does this allow you to skip the surrounding levels but a cache of coins means that your character can purchase enough hardware to handle the challenge. If you decide to take the longer route you will be rewarded by a display

of hostile machines never before seen on your 64. Small robots fly through the maze, moving collectible items, large cannon armed robots guard the passage ways and the infuriating devils with the flaps, a killing blow can only be landed on them when their doors are open. The lack of colour makes the starting for a little awkward to spot so just count the number of items currently in circulation and if the number is greater than your fighter firing capacity remember to dodge.

Remember not to panic when a little sign pops up and points to some danger off to one of your sides, as to turn you need to press the fire button and move the stick, the other way around and you blast the wall.

This is not so much a bad conversion but a bad game which without the advantages heaped upon it by a dedicated arcade machine, fails to produce goods. Adrian Paschley



INFO

Gameplay: 47%
Graphics: 60%
Sound: 78%
Usability: 73%
Overall:
60%

Xybots is one in a range of Tengen conversions by Domark, who currently holds the license to convert all Tengen releases to home micro formats for the next three years.



APB

Domark - £9.99 Tape £12.99 Disk

The third game from Atari subsidiary Tengen puts you behind the wheel of a police car.

APB or All Points Bulletin, casts you as a rookie officer. Bob who must patrol busy streets waiting for criminals to appear. However, these crooks are far from dangerous - consisting merely of litter bugs, drunks and hitch-hikers. You must arrest enough of these to meet your daily quota.

Your job is made easier by the fact that these crooks drive around in colour-coded cars which are simple enough to drive up behind them - send your siren to pull them over and bag 'em! When arrested, To help you, you can also pull into a gas station for more petrol, grab a doughnut to give you more time, and visit a speed shop to keep up your patrolcar by adding more car control, speed, acceleration, and even a gun to shoot more serious crooks.

By day three of your eight-day career you will be called to track down a more serious criminal going under a noble pseudonym, such as Freddie Furch and Sid Saper. He isn't as easy to track down as the litterbugs and has to be summoned off the road before coming quickly. Once caught he must be interrogated by wiggling the joystick left and right in order to get him to sign a confession before your shift ends.

APB promises cartoon style humor and graphics, but delivers a spy-hunter style driving screen and tiny beeping and report screens that hardly fill a fraction of the screen. This is the third Tengen game where collecting credits so that you can money bags can be cashed in at a shop for improvements to your tank, robot or

police car. Let's hope that future releases aren't just the same game system in a different setting.

All things considered it just doesn't add up. Tony Hetherington



APB: Another Police Beat



APB: What? I've gotta arrest some things?

Below: I think I'd rather deliver to the bar first



FEATURES

SMOOTH CRIMINAL

If you want to achieve anything that the rest of the world isn't achieving, the only way is to not have anyone else see it. If someone had the credit to be able to place that Michael Jackson *Thriller*—inspired record—stage set behind Jackson, that's all it would be the same.

Finally, when the happy day comes, you can be certain that you will remember the man of a lifetime being. He will be a man in charge, talented, serious, but not afraid of any challenge, devoted and honest, who will take the best out of the others.

The capital of new time is right to where it is. 1980, when the independent left first came to this, that it was their opportunity to take the railway from the rails, that is, to take them from the rails. The left is not. Michael the 1980s.

Michael Jackson, pop phenomenon or over-publicised eccentric? His Henfers-n explores the man, his music, his movie and previews the forthcoming game from US Gold.



them, but not the 15-year-old who they addressed their first lawsuit against.

When Michael was 13, he received, guess what, the first copy not of *Thriller* but of *Wendie*. "He was the first person to receive the world of music, and especially the first record. That was why, appearing in the promotional of *The Winner*, I was called 'The Win'."

15th night he was already at the point of death in the game. He didn't think about his "win" record. "Yes, the record is the only record," he says.



MOONWALKER

FEATURE

and L. Alvarado Jr. was awarded the Iron Man Award for 1992. The two teams have split the last three seasons with the Cardinals leading in 1990 and 1991.

Have your car dealer call! They can tell you that feature right now.

1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 26

The 1981 film *Michael* and *Three Men in a Boat*—of which is seen a scene from the last scene only—reflects all it takes to make a comedy by Mr. T. In *Michael*, he is seen with a girlfriend, first, and then Michael is made president of a Hollywood studio. They are happy in love and with legal and financial success. *Michael* provides a lesson that *Michael* is not the perfect one. *Michael* is a comedy.

He learned a lesson from his earlier work, and he was not alone. In the past, many people have been misled by the promises of quick riches. But now, with the help of the Internet, people can learn the truth about the risks of investing in the stock market. They can see the real returns and the real risks, and they can make their own decisions. This is a good thing, and it is a sign of progress.

Like I mentioned, he was the only one I met on a very large Texas farm, and even more interestingly, he was the only one who was a white male. The fact that a few white people of the industry felt he was so sufficiently qualified for this, and that he was the only white male I met for such a long time.

"He did... others of them were very happy about it, which is just as well as it's not all about them. The thing is, and please, Michael, don't let's slip up on this. In November, last year, I told you."

[illegible]

The three that represent the nation's leading 500 "retail" top 100 food companies will also be competing to bring to market a new, and the whole game is giving it the early season-to-go. The 500 is not a new record, but the product will, with the help of the Reynolds & Reynolds of New York, Massachusetts and the University of Wisconsin, and the National Academy.

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**Andrew Brown, the man
around town, goes to
PCs.**

Welcome to PC Corner, the part of the magazine for all Commodore DOS users, whether fledglings or old hand. This month it's a mixed bag of mostly software reviews, plus an intro to batch files. First though, I'm going to kick off with a couple of news items.

Loran Corp. (see Magellan review) has been busy lately. Not only has it got both D2 releases 2.2 and 3.0 onto the streets, but has upgraded the help available through its dealer network. The new system uses a CD-ROM disk called unimaginatively, CD/PROMPT. With over 10,000 pages of information on the disk, that same beleaguered source of "Oh it's not in the manual, we'll have to check, with head effort" no longer holds any water.

With the start 10486 chip now becoming available as upgrades for systems such as the IBM PC2, and AST Premium 386 machines, speculation over processor upgrades for other machines is rife. It seems however that someone out there only has 28MHz T28 is not yet to be tempted, or was it maybe not? Certainly the much rumored 10486 machine is on the stocks, but what else?

Batch File Fun

It is often thought that MS-Dos computers do not have a programming language built in. In fact they do, the so-called Batch language, which really is just an extension of MSDos.

Batch programs are just like those you may have written in Basic, but there are differences. The commands available are somewhat limited, and each program is really a text file. However, some useful things can be done. For example with Autoexec.bat. This is the Batch program that controls the computer at start up, so it's very important. Much can be done with

LIFE'S A DOS

Automatic hat, and I may cover the options in future columns. For the now best in a simple mood for your single-drive setup. The following text should be prepared with whatever editor you use, and saved as a text-only file.

```
echo off
path = c:\
prompt $p$g
copy command.com c:
```

You should also prepare another text file with the following command:

```
File = 20
Buffer = 20
device = Ramdrive.sys
Set command = C:\command.com
```

Next, make a working copy of your boot disk and copy both text files to it. Also copy the file Ramdrive.sys to the disk. Rename the first file Automatic hat, and the second Config.sys. Below, and everything should go as normal, except for a message similar to this:

```
Microsoft Ramdrive Version 2.00 virtual disk c:
Disk size 64K
Sector size 512 bytes
Allocation unit 1 sectors
Directory entries 64
```

When you have done is created a RAM disk, which becomes drive c:, and copied Command.com to it. You may still be wondering what this will do for you. The answer is that you should no longer see messages like this: Invalid Command.com disk as default drive and strike any key when ready.

Command.com will always be available to the system, and installing disk swaps kept to a minimum. Hard disk systems can still use this trick occasionally, as it does speed things up somewhat. The one drawback of storing booting data in memory is that the system. Note, this is only meant as an example and some programs will not work under this configuration of DOS.

• Typography

Just about everybody these days has heard of DTP, however fewer people actually put the theory into practice. Reasons for this are complex. An important factor has been the gap between high-priced low-performance systems, and the more exclusive Postscript-based line. Some might regard this state of affairs as a bonus, preserving the preponderance of typographic decisions on the world.

One way of narrowing the gap is to provide the low-end user with some of the excellent font libraries only available to Postscript users. The GSI have done, with their Typographic range of outline fonts. The second way of acquiring them is by purchasing one of the two collections: Prime, consists of Sans, Serif, and Courier which is the equivalent of Helvetica, Times and Courier in Postscript printers. Standard, has all the rest, and is much more numerous, with such things as Zapf Dingbats and Sans Marrow. Together they make up the equivalent of the 85 fonts available as standard in Postscript printers. The two collections come complete with a three ring binder, manual disks and poster showing the fonts available. Individual fonts are also available.

If you want to make use of the fonts, you have to install them first. This is a clumsy process at best, and irritating at worst. Everything has to be specified from menus and sub-menus, you can't just walk around the screen selecting what you want. Also, as the program generates bit-mapped fonts, the time taken can be excessive. For example, I specified an extensive range of point sizes from 6 to 72 in a single style of one outline font. Typographic suggested 18 minutes. It took me 10 minutes to generate the fonts, which then occupied 360K on my hard drive. Of this, the 72 point style occupied no less than 1 Mbyte. Sample mathematical files gave me a figure of 72 Mbytes for the 60 fonts supplied as part of the standard collection. The moral has to be, use the minimum



number of fonts necessary to do the job unless you have a massive hard disk. Unfortunately you are then severely hampered in your choice of fonts, effectively back to square one. And what happens if you wish to use the fonts with two or three different applications?

On the plus side, a large number of applications and output devices are supported including typesetting machines. These however can only be used if you specify the postscript names for the fonts when generating them.

My overall verdict is a cut-clicker way of widening the scope of your DTP work, but really needs a large hard-disk to get the most out of it.

Lotus Magellan

Magellan has been hailed as one of a new breed of DOS shells. What's a DOS shell you ask? Simply speaking, they are a way of controlling DOS without using the system prompt. That includes everything from simple batch programs to MS Windows. A starter definition however would add the fact that some part should remain in memory while your programs are running. This allows the main session to be reloaded when your program terminates. By that definition, Magellan is the Rodeo King of DOS shells. It has elements of artificial intelligence with its fuzzy search routine and 'Hypertext' facilities that allow you to treat all the files on disk as one enormous database.

Magellan builds an index of files stored on your hard disk, knows from a list of templates what is in those files displaying the contents accordingly. Other and Lotus 123 files are just two types it knows about.

You can search for data on files in several ways using the Explore option. Magellan's file viewer allows it to display the contents of the files as a form, view in that of the running applications. Then Lotus 123 files are displayed as row and column format, dBase files as tables, and so on. Launch OFP is another powerful command, because it not only allows you to start up programs from within Magellan but also gives extensive control over the process. It does this by making use of the powerful Macro facility built into Magellan. Of course it's not perfect, but it could save you a lot of key strokes over the year.

All the other facilities, such as copying, deleting, renaming and printing files are also present, and as you would expect from such a polished product are well implemented.

Documentation is probably the most impressive I have ever seen. There is a ring bound manual, plus two small booklets, and all sort of other. However I found the manual pedestrian, if thorough. Full marks though for index and Glossary material for this kind of product.

Magellan is a well finished program, but what will be its use? Clearly Lotus intends the product to fit in with its current base of corporate 123 users, but who else? Certainly anyone who needs to organize their hard disk, or where a number of people need to access data on one machine. But, the kind of disorganized people who do need Magellan are, by definition, the first likely to purchase it.

PC ENGINE SERVICES

Southbank House, Black Prince Road, London SE1 7SJ

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[illegible]

ALL PRICES INCLUDE P&P. FOR SOFTWARE PLEASE ADD £100 P&P.



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[illegible]

10. The following information is available for the year ended 31 December 2014:

Delta Pi Software Ltd



|| Rachael.Lahey@NASA.gov || Phone: 703/902-5800 ||
 || <http://www.nasa.gov/people/156/lahey> || Fax: 703/902-5801 ||



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If you are seriously interested in using or programming any Commodore computer, then getting ICPU8 is a must. For full details, send a stamped, addressed envelope to:



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Runs the system and runs the system - includes the automatic recovery program - for system protection.

HOW TO ORDER...

FRONT

Runs the system and runs the system - includes the automatic recovery program - for system protection.

POST

Runs the system and runs the system - includes the automatic recovery program - for system protection.

FAX

Runs the system and runs the system - includes the automatic recovery program - for system protection.

**DATEL
ELECTRONICS**

SYSTEM PROTECT

HOW TO ORDER...

FRONT

Runs the system and runs the system - includes the automatic recovery program - for system protection.

POST

Runs the system and runs the system - includes the automatic recovery program - for system protection.

FAX

Runs the system and runs the system - includes the automatic recovery program - for system protection.

ZEKE MAN

**Rik Henderson, the man in the dayglo
lights, deals a severe dose of comic
capitol**

comic. 1.adj. (adj.) Of or like comedy (*arrog. opera*), designed to amuse, satirize, burlesque, funny. 2.noun. paper. *History of Rome, Ireland* 3m (bookings) *Comedian*, paper (America, national publication full of humor) at a (-ly), much-provoking, queer, odd, silly n [L. 1. Oh (Komer revrd)]

- The Pocket Oxford Dictionary, Fifth Edition

Although everybody must have a vague idea of what a comic is, I feel the dictionary entry above contains a phrase which sums up its definition perfectly. "National publication full of humor" may not say "laugh" so you, but we're moving into the 1990s. And the comic industry is coming with us.

Long gone are the days when children flocked to the newsstands to see if Spiderman had vanquished Doctor Octopus (again) and if Superman had pulverized Lex Luther (again). Now dark landscapes are the settings for brutal crimes and many superheroes keep their inner secrets inside their trousers. Batman has acquired weaponry (and lost a partner). Dan Dare (the great, great, great, great, great grandson of the original that is) has died and been resurrected. And even Judge Dredd has turned from being a future psychotic killer into an old fascist psychotic killer.

This can be put down to one thing. Comics are no longer for children only. A fact that became apparent when *Viz* was launched in December 1989. The publication now claims to sell around 300,000 copies every two months. The content is crude, barbaric, and at best can be described as toilet humor, which goes half way in explaining why I paid another 799,999 dedicated readers) here in at much.



Another comic series which has confirmed our favorite character is a more adult status is 'The Dark Knight Returns'. Written by Frank Miller - who is, at the very moment, writing the script and screenplay for *Batman 3* - it looks at the future of Batman, and plots a fitting end to the caped crusader's career. Many scenes from *The Dark Knight* were converted into anime format via Tim Burton's *Batman* masterpiece, thus proving what a strong plot Frank had devised!

But there were just the first of the 'batman' reader's series. There was an enormous flood of them in 1987 and '88, and we can expect many more to come. One other of noteworthy note is 'Watchmen' by British comic writer Alan Moore. It examines superheroes in a realistic society and comes to the conclusion that heroism is something frowned upon by a majority of 'real' people. Of course, like *Dark Knight* became *Batman*, Terry O'Neil has already signed on the dotted line to inject this piece of comic literature onto the cinema screen.

Both of these products came from American based DC Comics. There are of course many British comics that hold their own in the U.K. market. One such comic is 2000AD. Founded in 1977, it sought to replace *The Eagle* as a space-age action paper for young and old, unfortunately it did far more than that.

It has established itself as the top of it's field (although competition is very fierce) and it's characters are now household names (in my household anyway!). As from it's 550th issue, they should all become household names in America too, as it will be in the shops there at the same time as here.

Also under the 2000AD name is *Crest*, a comic that seeks to educate whilst remaining enjoyable and not too heavy. Dealing with personal and social values, it is incredibly well-drawn and it is a rare comic that will get me out a newspaper ready to receive a copy.



VIZ

PRINCE
CHARLES
IN
AUSTRIA

ROGER MULLIN

Another new magazine to come our way is *Deadline*, which is edited by one of 2000AD's greatest artists. It won't be described as a comic down-to-earth, pop-culture version of 2000AD, more than anything else, and it seems to be doing extremely well (having just held it's first birthday party at the Lambeth club in London's West End). It contains several strips, such as the new satirical 'Tank Golf' by James Hewlett, and a few interviews and features on up-to-the-minute cinema. *Deadline* is monthly and it comes highly recommended.

When DC are looking to update their characters, Marvel haven't quite got the idea yet. This week, Marvel UK has recently released an amazing little monthly titled 'The Silver Brothers'. This is a sort of *Wings Brothers* in the future. It follows the exploits of two private eyes in a city full of delinquency, crime, sex and violence (although not necessarily in that order). It's very humorous and is well worth seeking out.

The software houses have also decided to capitalise on the new popularity of comics. Virgin Mastertronic has announced two games based on famous characters - *Silver Surfer* is based on the Marvel superhero of the same name (it's clear and he's got a wicked, great, cool based on which he can fly), and then second house is *Viz*. They say that the latter will not be based down as they may run the risk of the game, but the cover will display a copy as the effect of 'mature gamers only'.

Clayton, of course, has *Ramman* - the movie, but it also has the rights to *Watchmen*.

The Edge has *The Punisher* (a vigilante driven by his family's death in the hands of a crime organisation) and *The X-Men* (a superhero group containing every tough and nasty character). It has also announced a few more to come next year. *Harold* is blind superhero who is anti-drugs and just about tells everything else as well, and *Whodunnit* (a character who has large, very sharp claws that he can extend from his knuckles).

Empire has *Doctor Doom's Revenge*, which is based around the Fantastic Four's oldest and most feared enemy.

Ramman also has it that there will be new games based on (just for a) *Captain America*, *Judge Dredd*, *The Swamp Thing*, *X-Factor*, *The New Mutants*, and *Bayou Trooper*. We can be guaranteed though that this will not be the end, there is a whole universe of licences just waiting to be grabbed.

in O
Tel





YOUR PROGRAMMER

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Automated control for spritz positions, as they wander the screen.

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Keep your profits private with this security program.

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Removes from magazine and out spritz. Punch holes where indicated and insert in a ring binder for easy storage and long-term protection.

If you want to achieve a truly three-dimensional quality to your sprites here is an incredibly short routine for you to use. It's very short so there isn't endless lists of data to type in.

Examples of three-dimensional sprites which spring to mind are the various sport simulations such as 'International Soccer'.

As you probably know, sprites have a definite priority arrangement so that the lower the sprite number

Make use of the priority properties of your sprites

By J. Simpson

SPRITE PRIORITIES

the higher is its priority. This means that sprite 0 has the highest, through to sprite 7 which has the lowest.

Sprites with higher priority always display in front of those with a lower priority. This is fixed within the hardware of the VIC II chip, which means if you want to create a three-dimensional illusion, then a routine needs to be constructed which will manage the sprites by keeping foreground sprites higher in priority.

To handle this, I decided that sprites lower down the screen would be considered as 'foreground' to those higher up the screen. I'm sure you know that the pixel map is arranged with the 'Y' coordinate running from 0 at the top of the screen, to 255 at the bottom. The Machine Language routine, **SPRITE PRIORITIES**, uses the 'Y' coordinate information to decide which sprite should be where, the sprite with the greater 'Y' value becoming sprite 0, and so on.

Within the routine

I SPRITE PRIORITIES does is the ML routine which deals with choosing and updating all the sprite positions and their priorities. If a sprite moves up the screen (or backwards into the picture) and is doing so it passes above (or behind) another sprite, then **sprite priorities** will swap the two sprites around, together with all data relevant to each (i.e. image, Xpos, Ypos, Xspeed, Yspeed, etc). This really holds together the illusion that a sprite's priority is changing - first passing in front of, then behind another sprite. This does, however, pose a tricky problem! Let's say that the joystick is being used to control one particular

image; are simple coloured blocks. Their default values are:

Block 1 - White
Block 2 - Red
Block 3 - Cyan
Block 4 - Purple
Block 5 - Green
Block 6 - Blue
Block 7 - Yellow
Block 8 - Orange

You can use the numerical keys (1-8) to select any one of the eight blocks. That block will now be under **CONTROL**, and can be manipulated around the screen using the joystick plugged into port 2.

If you study the listing, you will see that in the **INITIALISE** routine (lines 68-78) variables 'N' and 'E' have been declared, and the two arrays F() and D() dimensioned. At line 78 the arrays are filled: F() with 0 to 7 and D() with the 'Y' coordinate value of each sprite, from 0 to 7.

sprite's control. Normally that control would be defined and controlled using one particular sprite - say sprite 0. All that needs to be done is to peek and poke for ML equivalent) with 'Y' coordinate information into sprite 0. However, should sprite 0 move up the screen and pass the next sprite, then **CONTROL** shifts to sprite 1, and if **CONTROL** carries on up the screen it might become sprite 2, 3, 4, 5, 6 or 7.

2. BASIC DEMO - For programmers, and to show the system working, the basic demo program defines a demonstration of **SPRITE PRIORITIES** in action as well as useful routines for the controlling of which sprites are where. When you 'RUN' the program this is after loading **SPRITE PRIORITIES**, and typing 'NEW' then loading **BASIC DEMO**, eight sprites are displayed diagonally across the screen. The

The array F() holds the current position of the **BLOCK** (not the sprite) on the screen, and D() - which denotes from 'Dummy sprite'.

holds the current 'Y' location of where each sprite would be, should there be no **SPRITE PRIORITIES** manipulation.

The variable 'E' is used to shift joystick **CONTROL**, over the block selected from the numerical key input. A loop checks through the F() array to find the current screen position in relationship to the sprite. For example, **BLOCK 5** might be at the bottom of the screen, and so it would be sprite 0. When 'N' is set to equal the actual sprite value - in the foregoing example, 5. When the joystick is moved up or down, program control will call either **JUYSTICK UP/Down** (lines 31) or **JUYSTICK DOWN** (line 32). Let's say 'up' is the selection. First **D5(E)** is decremented (E=Block being moved), and the array

parameters are checked (line 22). Then the updated value in DSX(1) is poked into the "Y" register of the sprite holding the data for that BLOCK. "N" holds the sprite number.

Next, the CONTROL sprite's "Y" coordinate is checked against the next lower prioritized sprite "Y" coordinate. If CONTROL is greater, then it maintains priority and so the program skips lines 25-27 and returns to MAINLOOP. No more need to be done. However, should the coordinate rules now be lost, then line 25 calls the ML routine SPRITE PRIORITIES, where priority and all relevant sprite data is toggled down one to the other. On return from the ML routine, "N" is now incremented to the next highest sprite number. This is followed by an error trap, and UPDATE flag ARRAY (line 64), which will update F(N) for the current sprite position. Moving down the screen is the reverse of the above.

check out lines 22-29. Left and right have no effect upon priority, and so these are standard routines to PEEK and POKE "N" coordinates.

A Stage Further

To take things a stage further and have multiple sprite movement on the screen, the variable "N" would need to become an eight element array. Each image, block, or whatever, would be given a constant value from 0 to 7, and when the program updates "Y" coordinates for each element, M(Element Number) would be used. This could be followed by a line such as:

ON (ELEMENT NUMBER)
GOSUB(PARAMETERS)

Here subroutines would handle differing images, or characters, and/or situations.

I have not incorporated a sufficiently distinct routine within the Basic demo as the main purpose is to show how effective SPRITE PRIORITIES is, and to offer a demonstration of a method of control. Callous demo should operate quite normal without any problems. For ML programmers, the conversion of the Basic demo routine into assembly should prove to be quite elementary.

Sprite Image Data

I have included a listing of data for sprite images which will display, numbered 0 to 81, three-dimensional, coloured boxes. The numbers corresponding with numerical keys and the colours as before. Should you decide to use these images, type in the basic loader and data base, and save to tape/disk. You will now have to make some changes to the BASIC DEMO program.

First, delete line 30 exactly. Change line 71 to read:
POKEP = C, PO = C
Remove the RDM from line 73 and type:
POKEY = 25, 10
Remove the RDM from line 75 and type:
POKEY = 31, 11
Remove the RDM from line 74 and type:
POKEY = 31, 12

Then transfer the modifications made and save the program to Gary 1 and Gary 2.

Getting it all in

Sprite Priorities - Type in and save the Basic loader program.

Sprite Image Data - If you are going to use the sprite data which is included, then type in and save the listing also.

Basic Demo - Type the basic program in. If you are going to use the additional sprite data under the secondary changes outlined above and save it.

Running the Demo

First load and run SPRITE PRIORITIES then type "NEW". If you are using sprite image data then load this in and type "NEW".

Now you can load and RUN the BASIC DEMO program. Remember, keys 1 to 8 will select the BLOCK you wish to control with a joystick plugged into port 2. Well, that's about it. I'm off to the pub for a pint. Hope you like SPRITE PRIORITIES, and run wilder if and expand upon it.

```

PROGRAM SPRITE PRIORITIES
10  G:PRINT:COL=COL+8:SPRITE=
   + SPRITE+COL:IN DATA - **
   + **
20  I=SPRITE:COL=COL+8:SPRITE=
   + SPRITE+COL:IN DATA
30  I=SPRITE:COL=COL+8:SPRITE=
   + SPRITE+COL:IN DATA
40  I=SPRITE:COL=COL+8:SPRITE=
   + SPRITE+COL:IN DATA
50  I=SPRITE:COL=COL+8:SPRITE=
   + SPRITE+COL:IN DATA
60  I=SPRITE:COL=COL+8:SPRITE=
   + SPRITE+COL:IN DATA
70  I=SPRITE:COL=COL+8:SPRITE=
   + SPRITE+COL:IN DATA
80  I=SPRITE:COL=COL+8:SPRITE=
   + SPRITE+COL:IN DATA
90  I=SPRITE:COL=COL+8:SPRITE=
   + SPRITE+COL:IN DATA
100 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
110 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
120 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
130 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
140 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
150 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
160 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
170 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
180 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
190 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
200 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
210 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
220 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
230 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
240 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
250 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
260 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
270 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
280 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
290 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
300 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
310 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
320 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
330 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
340 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
350 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
360 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
370 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
380 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
390 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
400 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
410 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
420 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
430 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
440 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
450 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
460 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
470 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
480 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
490 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
500 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
510 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
520 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
530 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
540 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
550 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
560 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
570 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
580 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
590 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
600 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
610 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
620 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
630 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
640 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
650 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
660 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
670 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
680 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
690 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
700 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
710 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
720 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
730 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
740 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
750 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
760 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
770 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
780 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
790 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
800 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
810 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
820 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
830 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
840 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
850 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
860 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
870 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
880 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
890 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
900 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
910 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
920 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
930 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
940 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
950 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
960 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
970 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
980 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
990 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA
1000 I=SPRITE:COL=COL+8:SPRITE=
    + SPRITE+COL:IN DATA

```

[illegible][illegible][illegible]

(continued)

[illegible][illegible][illegible]

01	LD	00000000	00	75	RDY	*** ADDRESS LUTTING	04	80	RDY	*** INST ADDRESS **
02	LD	00000000	01	76	RDY	***	05	81	RDY	***
03	LD	00000000	02	77	RDY	*** ADDRESS LUTTING	06	82	RDY	***
04	LD	00000000	03	78	RDY	***	07	83	RDY	***
05	LD	00000000	04	79	RDY	***	08	84	RDY	***
06	LD	00000000	05	80	RDY	***	09	85	RDY	***
07	LD	00000000	06	81	RDY	***	10	86	RDY	***
08	LD	00000000	07	82	RDY	***	11	87	RDY	***
09	LD	00000000	08	83	RDY	***	12	88	RDY	***
10	LD	00000000	09	84	RDY	***	13	89	RDY	***
11	LD	00000000	10	85	RDY	***	14	90	RDY	***
12	LD	00000000	11	86	RDY	***	15	91	RDY	***
13	LD	00000000	12	87	RDY	***	16	92	RDY	***
14	LD	00000000	13	88	RDY	***	17	93	RDY	***
15	LD	00000000	14	89	RDY	***	18	94	RDY	***
16	LD	00000000	15	90	RDY	***	19	95	RDY	***
17	LD	00000000	16	91	RDY	***	20	96	RDY	***
18	LD	00000000	17	92	RDY	***	21	97	RDY	***
19	LD	00000000	18	93	RDY	***	22	98	RDY	***
20	LD	00000000	19	94	RDY	***	23	99	RDY	***
21	LD	00000000	20	95	RDY	***	24	100	RDY	***
22	LD	00000000	21	96	RDY	***	25	101	RDY	***
23	LD	00000000	22	97	RDY	***	26	102	RDY	***
24	LD	00000000	23	98	RDY	***	27	103	RDY	***
25	LD	00000000	24	99	RDY	***	28	104	RDY	***
26	LD	00000000	25	100	RDY	***	29	105	RDY	***
27	LD	00000000	26	101	RDY	***	30	106	RDY	***
28	LD	00000000	27	102	RDY	***	31	107	RDY	***
29	LD	00000000	28	103	RDY	***	32	108	RDY	***
30	LD	00000000	29	104	RDY	***	33	109	RDY	***
31	LD	00000000	30	105	RDY	***	34	110	RDY	***
32	LD	00000000	31	106	RDY	***	35	111	RDY	***
33	LD	00000000	32	107	RDY	***	36	112	RDY	***
34	LD	00000000	33	108	RDY	***	37	113	RDY	***
35	LD	00000000	34	109	RDY	***	38	114	RDY	***
36	LD	00000000	35	110	RDY	***	39	115	RDY	***
37	LD	00000000	36	111	RDY	***	40	116	RDY	***
38	LD	00000000	37	112	RDY	***	41	117	RDY	***
39	LD	00000000	38	113	RDY	***	42	118	RDY	***
40	LD	00000000	39	114	RDY	***	43	119	RDY	***
41	LD	00000000	40	115	RDY	***	44	120	RDY	***
42	LD	00000000	41	116	RDY	***	45	121	RDY	***
43	LD	00000000	42	117	RDY	***	46	122	RDY	***
44	LD	00000000	43	118	RDY	***	47	123	RDY	***
45	LD	00000000	44	119	RDY	***	48	124	RDY	***
46	LD	00000000	45	120	RDY	***	49	125	RDY	***
47	LD	00000000	46	121	RDY	***	50	126	RDY	

PROGRAMMING

NUMBER CHECKER

Make sure your VAT invoice is a bonafide invoice with this simple checking program

By A. L. ENO

HAVE YOU EVER WONDERED whether that 15 per cent VAT added to your bill

really does go go the Taurus? Are you worried that the plumber's bill, awarded in secret to the back of a

Well, worry no more! With the aid of this simple little Basic program,

MOVING THE SCREEN

by Ewan Villiers

There are many great myths in the world such as Adam's, UFO's and, probably the prettiest of them all, the difficulty of moving the text and character memory round. This program has been written to test the limit of these myths.

Moving the text screen has many uses, take for example menus in adventures and windows in word processors. These must not harm the text beneath them and one method of doing this is to move the screen under autotype (if the screen isn't over the text it can't harm it). This program will also allow you to make small alterations to the character set without needing to use a character drawer.

I have included two versions of the program in the listings. The first is a machine code version (for speed) and the second a Basic listing (for ease of understanding). All busy readers should note that the Basic listing can be typed in and compiled to save messing around with data statements.

The program requires 3 variables -

1. A Commodore Interface Adapter Bank (CIA)
2. A screen pointer within the bank
3. A character pointer

THE CIA BANK

The chip which looks at the memory can only 'see' 16K at one time so this sets the bank to be 'seen'.

SCREEN POINTER

The CIA bank picks out a block of 16K. The screen pointer sets the next 16 blocks which mark the start of each screen.

CHARACTER POINTER

This is like the screen pointer except that, as the primary character set is 26 long, it is cut into 16 blocks (I haven't copied the second set so try changing to it when you run the program).

This is all you need to know to run the program (the addresses of the parameters are in the listings). But if you wish to understand the program, read on.

Changing the C.I.A. BANK (lines 370-380)

The first thing to note about this is that the bank numbers run in the wrong order. The number 0 denotes the fourth block (40123-48123) and the number 3 denotes the first block (16-14384). This is started on line 80 by subtracting three from the bank number.

It should also be noted that before the bank can be changed, the CIA must be set for input. This is done by ORing 36736 (and 252) with the

bank number (0-3). The only thing left to do is to inform the ROM that you have moved the screen (it is another bank now). The location 644 holds the screen address divided by 255. To inform the ROM, you need to OR 644 (and 63) with 64* the value bank. Once this is done the bank is changed and you can change the screen address.

Changing the Screen Address (lines 340-350)

This is easier than changing the CIA bank. The upper 4 bits of address 51272 hold the screen pointer so you just OR 51272 (and 15) with 16* the screen pointer. Again, the ROM must be informed of the screen's movement. This is accomplished by ORing 644 (and 63) with 4* the screen pointer. The screen has now been moved and you can now move the character set.

Changing the character address (line 400)

This is the easiest part of the program. The lower 4 bits of 51272 hold the character pointer. As the character pointer runs in 26 blocks, twice the pointer is stored there. This is done by ORing 51272 (and 240) with 3* the character pointer.

The CIA screen and characters have now been moved but you still can't use the program because you have not copied the character set yet.

Copying the character data (lines 189-230)

While this is not difficult, it is the most difficult part of this program.

The difficulty is in looking at the character ROM and making sure you are not interrupted. These problems are solved by two points, one is address 56334, to ensure that you are not interrupted, and the other is address 1 to allow you to look at the character ROM. The rest of this part of the program just copies memory and its addresses 1 and 56334 back to their original values.

128 Users

Doing this as there is much more for 128 users. The process of copying the character ROM only requires you to use the command Bank14 to gain access to the character ROM but a full guide to this can be found on pages 358-363 of the 128 reference guide.

The Machine code program

This is a short program encoded as data statements which has only 2 major differences from the Basic program.

The first difference is that while in the Basic program numbers are entered from 1 to 6, in the machine code version they must be in the form 6 to 6 as the program will not work.

The second difference is in the order of the subroutines in this program, the screen moving routine is last, so it can be called upon independently by an SYS command (SYS49354).

The position of the parameters (addresses 49353-54) is shown in the listing, so are the SYS addresses, so all I can say now is "happy programming."

ADDRESS CODE		70 71 72 73 74 75 76		140 128	
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00 0000	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00	000 000 000 00 000 00 00
00					

SPECIAL

Produce those colour fades with this simple to use program

By R. Hoban

If you have ever looked that little bit closer at a piece of software, you will notice many little touches that add a little bit more to the presentation. These touches can be anything from starting sprites to colour effects. In this article I would like to discuss the use of colours to produce a fade effect, which when used in conjunction with your own program can create great fade and instruction screens.

The first thing we must define is: What exactly is a fade? A fade is basically where something, be it a sprite, gradually appears or disappears into the background. When an *sprite* appears, it is known as a fade-in and when it disappears, a fade-out.

In order to make the item fade, we must cycle it through a sequence of colours. To help you understand this, we will take a practical example. I want an instruction screen faded in from a black background and the instructions to end up in the colour yellow. We must now create the necessary colour sequence. The first colour should be the background colour - which in this case is black (000). We now want the text to gradually move from dark to light. The colours best suited for this are the three grey colours. So we add Dark grey (200), Medium grey (300) and light grey (400).

Next we have an intermediate colour, which in this case is white (500). This intermediate colour is

preferably the opposite of the background. Lastly we put our final colour in which is yellow (600). If we had chosen the final colour to be light red then we could have put dark red in after white and then light red (more to provide a smoother colour transition). If you look at diagram 1 then you will see this whole example amplified.

Hopefully you should have followed all this. If you look at diagram 2, you will see the complete sequence for our example. So how do you use this sequence in your own programs?

If you type in **FADER LOADER**, which is in Basic, and run it, it will produce a program on disk called **FADER.MC**. Now in your Basic or M/C program all you have

FADER THEORY - DIAGRAM 1



PLANTING AND CULTIVATION **DR. H. P. SINGH**

COLOUR	BLACK	GREY	MOOREY	LOREY	WHITE	YELLOW
DECIMAL	0	51	12	75	1	7
HEX	000	888	88C	88F	FFF	FFF

to do is load **FADER.BC** and then print the values for your sequence (in location **SC003**) and then you are done, terminating the sequence with **HT (255)**. Now all you have to do is print the text you want to be faded onto the screen in the **NAME** column as the background. E.g. if you are fading the text on from a black background, then print the text over the screen as black. It is then only a matter of typing **HT\$0000** and here you are!

If you want to see this in action, then type in **PADEIR DEMO** and run it. Note, you must have **PADEIR.MC** on the tape or disk first. I have posted the demo to do the lode in as in the example I have just given. Now the

you know how to fold-in, you can fold-out simply by reversing the sequence.

This fade technique can be applied to sprays and high-resolution screens. Hopefully you should be able to develop your own programs to do this. An example of doing a fade with sprays is given in the section SPRITE FADS.

On a final note, you should have no problems typing in the programs as they are all in Basic. Also for those of you uninitiated, I have given a rough-flow diagram for FAIRER.MC which is shown in diagram 3. So that you have everything you need and hopefully you should be able to put the excellent techniques to good use.

[illegible]

**TAPE USERS WILL HAVE TO
ALTER ALL THE Rules.**



DOI: 10.1002/for

[illegible][illegible]

姓名：_____ 学号：_____

班级：_____

[illegible]

Keywords: child sexual abuse; disclosure; social support

```

84 0 00000000
85 10 00000000 0 00000000 0 0
86 00000000 00000000
87 00 0000
88 00 0000-00000000 0000 0000
89 00 00000000 0000
90 00 00000000 00000000
91 00 00000000 00 00000000 00
92 00 00000000 00 00000000 00

```

[illegible]

Strung Along

Understand the use of strings with this clear, concise explanation

By E. Dumbill

It is common knowledge that Commodore Basic is far from easy to use at the best of times. This problem may have put many people off trying the program for themselves. One of the main inadequacies in the language is the functions designed to handle string variables, that is, LEFT\$, RIGHT\$, and MID\$. I will describe the use of these functions in detail later. Basically, they allow the programmer to extract 'bits' of string variables or manipulate within the program. Very well, you say, so what is wrong with that? Well, the problem is that while you can use LEFT\$ etc. to extract bits from strings, see Figure 1, you are not allowed to surgically change parts of a string, see Figure 2.

Figure 1

```
AB="ABC"
PRINT LEFT$(AB,2)
the result would be AB
```

Figure 2

```
AB="ABC"
```

Now, supposing you wanted to change the 'AB' to 'DE' you might type
LEFT\$(AB,2)="DE"
the result would be 'Syntax error'

As you can see, the computer will let you see what is there, but you are not permitted to change it. Many other forms of Basic do allow this function. Wouldn't it be nice if, just like using DEF FN as an arithmetic, we could define functions to allow us to alter strings? But, you have guessed it, Commodore will not allow it. I thought that this was inconvenient to say the least, and so I produced a series of subroutines which would allow me to alter my strings.

I will start at the beginning and describe to you how each function works, and how the original version of it works.

LEFT\$

The function lets you take the leftmost characters from a string. The syntax is LEFT\$(string, element), where element is the amount of characters you wish to extract. This number can obviously not be greater than the number of characters in the string.

RIGHTS

This function is very similar to LEFTS, it does $\text{RIGHTS} = \text{OLD STRING} - \text{LEFTS}$ from the string. The syntax is identical to that of LEFTS.

MID\$

This function allows you to take characters from the MIddle of a string, starting at the character that you specify. It is a very useful function and has many applications. For example, searching through a string to find a key character (perhaps '?'). The syntax is $\text{MID\$} (\text{string}, \text{start}, \text{characters})$ where start is the start character and characters is the amount of characters you wish to extract. Figure 3 shows a very simple example.

Figure 3

```

A$="ABCDE"
PRINT MID$(A$,3)
the result would be: BCD

```

Now you know how to use the main functions, we can use these functions to help us define routines to alter strings at our leisure. Let's start with LEFTS. If we are altering the LEFTS part of a string, we are obviously leaving alone the RIGHTS part of the string. With this in mind, we can use the:

```
altered STRING=NEW BITS+RIGHTS (OLD STRING,N)
```

But, we do not know how many characters to change in the LEFTS, and consequently, how many RIGHTS characters (represented by N) to put on the end of the altered string to make it complete. For this, we need to use another function: LEN. This returns the number of characters in a string, referring to Figure 3 the instruction:

```
PRINT LEN (A$)
would result in 5
```

If we can tell the number of characters, we want to leave alone, i.e. LEN (STRING) minus N. We can put this into our program using LEFTS as given:

```
altered STRING=NEW BITS+RIGHTS (OLD STRING,N)
```

But, it is a pain to have to state both the NEW BITS, so we obviously, need to use our friend LEN, and define N as LEN (NEW BITS). So our revised program looks like this:

```
ALTERED STRING=NEW BITS+RIGHTS (OLD STRING, (LEN OLD
STRING)-LEN (NEW BITS))
```

Complicated isn't it? No, not really! Here is a breakdown of the ugly looking RIGHTS function I used. What it does is to take the original string, and to chop off the LEFTS that is to be replaced by NEW BITS. The length of the bit remaining after the RIGHTS is given by subtracting the length of the changed bit (NEW BITS) from the length of the original string.

Where?

Now that we have struggled through that, we can actually do something with it, and write a routine to use in our programs.

Now I showed you how to alter strings but what about...

```

1000 GOTO 1010 : GOTO 1010 : GOTO 1010
1010 GOTO 1010
1020 PRINT "DAN SAT ON THE MAT"
1030 GOTO 1010

```

If you now run with `GOTO 1010` `PRINT` will only appear once, since `LS` will have changed to `DAN SAT ON THE MAT`. Just a few notes about the routine: You will always have to use `LS` and `NL` for the strings to be specified, as there is no way of creating a new function. What we are doing is making a program that uses global variables, and there is no way of making values of variables stay *ONLY* inside the routine (`LOCAL`) as there is in other languages. That is the major limitation of the routine. So if, for example, you are using the variable `WS` and wished to alter it, you would need to make `LS=WS` before calling the routine, and `WS=LS` after calling the routine. For this reason, you may find it more convenient to include line 100 as part of the main program, instead of using it as part of the subroutine. This too has its disadvantages, such as getting a sore finger from repeatedly typing line 100!

The subroutine for a surgical `RIGHTS` is obviously going to be much the same, but we must exchange the `RIGHTS` in the routine for a `LEFTS` as it will be the `LEFTS` that we will now want to leave intact!

Here is the routine for a surgical `RIGHTS`:

```

1000 LEFTS=LS;LEN=NL: LEFTS=NL
1010 RETURN

```

The use of this routine is much the same as the one above. How simple you say? (Does it look easy? Well, yes it does, but then we discover a stumbling block in the form of `MIDS`. However, with a bit of logical thought we can overcome it.

Just as a string is composed of `LEFTS` and `RIGHTS`, it is also composed of `LEFTS`, `MIDS` and `RIGHTS`. Therefore, we now get:

```

ALTERED STRING(LS+LEFTSOLD(S)+NEWS+RIGHTSOLD(S))

```

As with `MIDS`, we can't get away with 2 parameters, `NL` and `LS`, but we need a third, `S`, which is the character at which the `NEWS` will start being inserted.

From that `S`, we can calculate all the information that we may need:

```

number of characters in LEFTS=S
number of characters in RIGHTS=LEN(LS) - S: LEN(RS)
so the program for MIDS surgery looks like this

```

```

100
10 LS=LEFTS(LS)+NS+RIGHTS(LS,LEN(LS)): S=LEN(NS)
101 RETURN

```

Use it as for the routines using `LEFTS` and `RIGHTS`, but with the extra inclusion of `S`, the start character for the insertion of `NS`.

I hope that you have enjoyed and understood this approach to constructing program routines to the end of making your own functions. Also I hope that you can appreciate the power that a little thought adds to the humble C64 Basic.

Keep stringing!

EXTENDING BASIC PART 8

**Add an auto line
numbering facility to
your collection of
extended Basic routines**

**By Burghard-Henry
Lehmann**

When you enter a Basic profile, the one thing which is fairly regular is the line numbers. Since computers are very good at doing regular, monotonous tasks it makes sense to let the computer do the line numbering. All you have to do then is worry about designing your program!

Automatic line numbering is pretty easy. All we have to do is interrupt the flow of Basic in the ROM after a line has been entered into the profile, or before a new line is started off - whichever way you want to look at it. For this let me elaborate on how Commodore Basic deals with a newly entered line.

Basic Warm Start

The whole process starts at \$A461, the so called *Basic Warm Start* routine. This is the central point to which Basic jumps back each time a line has been entered into the profile or a direct command has been executed.

This point is so important, that it has been visited by those clever Commodore ROM designers. This is, instead of jumping straight to \$A462, the computer looks the address it has to jump to from the vector at \$002C. Under normal circumstances this location which lies in RAM and can be changed by the programmer, contains \$A461 - the *Basic Warm Start* routine.

This will be the point where we will interrupt Basic to introduce our auto line numbering routine. More about this in a minute.

At the beginning of the *Warm Start* routine the computer goes into a loop which waits for the user to enter a character on the keyboard. This character, which can be anything at this point, is stored in a location, called the *input buffer* (\$0200). Now the computer waits for the user to enter another character, this is stored in the following location in the input buffer, and so on until the user presses the return key (ASCII 13). This finishes this loop and terminates the character in the input buffer with a zero.

Now the computer finds out, if the line entered has a line number in front of it or not. If it hasn't got a line number, the "statement", as it is called, is interpreted and executed immediately as a direct command.

If the line starts with a line number, the keywords in the line are converted into tokens and then the computer looks if a line with the same line number is already present in the profile.

If a line with that line number exists already, the old line is deleted.

Finally, the new line is inserted into the profile.

If the line has nothing after the line number, nothing is inserted into the profile, thus if this line already exists it will be deleted.

Auto Line Numbering

To introduce auto line numbering we first need a new constant which starts at 0.

I have chosen to use the standard extended command **AUTO**. Note, when naming for **AUTO**, the last two letters of the command will be tolerated by the computer into **AAA**, since **TO** is a Commodore Basic function.

To produce line numbers automatically we need to know two things: Which line number does the user want to start automatic line numbering? What step or increment does he want the line numbers to use?

AUTO therefore needs two parameters.

The line number to start with.

The increment up to the next line number.

Both parameters should be separated with a comma. I haven't bothered to build in any error checks. If you want to be pedantic, you should know by now how to foolproof something like this and force the computer to give a syntax error report.

The auto routine itself starts by collecting these two parameters and saving them into the zero page locations 231/232 (first line number) and 233/234 (step/lines 1648-1780).

Next we change the Warm Start vector so that it points at our routine, instead of the usual routine in the ROM (lines 1820-1830).

Now we print a carriage return, which puts the cursor onto the beginning of the next line (lines 1890-1900).

Now we are all set to do auto line numbering.

The overall mechanism of auto line numbering is as follows: The current line number, contained in 231/232 is printed on the screen (lines 1990-2040). Then it is copied into the beginning of the input buffer (lines 2080-2130).

To point the number on screen we use the normal ROM routine **SPRINT**, which prints any number whose low byte is in **X** and whose high byte is in the accumulator. So that the routine can print the number onto the screen, it internally has to convert it into ASCII digits. It does this and stores the ASCII digits at location 2040, terminated with a zero.

The reason why I capture all this is, that we make use of this fact when we have to move the line number (in ASCII digits) into the input buffer (lines 2080-2130).

Now the computer enters the usual loop in ROM, which I have explained above, and which waits for the user to enter a full line (line 2170). In this routine the **X**-register is used for the index to the input buffer. Normally the loop starts with **X=0**, but since we have already entered a line number into the input buffer, **X** contains whatever number of digits the line number consists of. We know the correct amount in **X** from the loop which we used earlier on to move the ASCII digits from location 2040 into the input buffer.

After this, we test for direct or line numbered statements (lines 2180-2260). This is a little superfluous here, since there is no question about a direct statement being given at this point.

Line 2260 calls a routine in ROM which converts the line number at the beginning of the input buffer from ASCII into the more useful low byte/high byte sequence and stores the result in zero page 214/215. This is used later to search the textile to see if the line number already exists.

Now all Basic keywords in the line are tolerated (line 2440).

Then the computer searches through the textile to see if a line with this number already exists (line 2450). If it does the line is deleted (line 2500).

In lines 2540-2680 we calculate the next line number by adding the step contained in 233/234 to the previous line number contained in 231/232.

Then there are two further ROM routines (lines 2690 and 2695) which re-organize the Basic textile and reset all the necessary pointers.

In lines 2700-2720 comes an important test which asks if there is something after the line number.

Most of the previous code I have copied straight from the ROM. Why the seemingly unnecessary duplication of code, you may ask?

Well, as I have already pointed out, it would be pretty annoying if we couldn't switch auto line numbering off and while auto line numbering is on you can't give a direct command! Furthermore, the vectors at 2080 to 2132

```

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By now you should understand how you go about purchasing new commands to Commander Blast and should be ready to write some of your own. Watch out for more hints, as in a later installment of *Exercising Blast*.

PROGLOK

Stop prying eyes and
itchy fingers with this
handy program

By Zak Beck

This program enables you, having just written your latest masterpiece, to "lock" the computer so that, say, the high school speed all your hard work. Before leaving your computer, it simply requires that you press "Y" and enter any 6-digit password. Before the computer will return back to the language (eg. BASIC), the correct code must be entered. This idea has been used before on expensive safety cartridges: will now you have it at home if no need?

How it all works

The program is written in machine code. Obviously, if it were written in Basic, it would not be comparable with your masterpiece. It resides below Basic, from \$1000 to \$14C11, in the application or cartridge program area. This means that Basic does not have to be moved about, but the program MAY clash with some cartridges which use this area as a workspace.

When you first use the program, start up Basic on key "Y" to call itself and then return back to Basic. When you wish to "lock" the computer, press "Y". The program first deactivates the reset key, presses up its title, and some prompts. It does this using a brand old coded "PRINM" print message. This works as follows:

```
PRN prompt
key "Message just here"0
```

(end of program follows.)

Having called PRINM, the com-

puter will print out everything that follows until a carriage-return "Y" byte. Then it jumps back to your sub-routine. This useful message-prints resides at \$2485, \$FFFD.

Proglok, having pressed on titles and prompts will then ask for any 6 character code. This is implemented by sub-routine "getcod" which assigns 6 characters, storing them in buffer "buff". Then the program stores the contents into the password storage space, "pass".

Next, prompts are printed (label "yes") to tell the user that the computer has been locked, and that to exit it he has to enter a 6 character password. Using "getcod", an attempt is entered into the buffer "buff", and the contents of "buff" are compared with the password "pass". If any discrepancies are found, the computer jumps back to "yes". Otherwise, the reset key is reactivated, and the computer returns to the language (eg. BASIC).

Using the Program

Type in the program (see getting it all) Next type the following:

```
SY54864 and press return
```

This will install function key 1 to read "SY54864" + chr\$(1) in the converted "KEY" will show.

Pressing "Y" in direct mode will call up the program, installing a call to address 484. You can now enter your key-word, using any of the keys on the keyboard, including Line Feed and those on the keypad at the right of the 123. I feel no characters provide a fairly secure code, who wants their computer to be Fort Knox?

The password having been

entered, the computer is returned to the initial key and can only be activated by typing in your code. When you come to want to use the machine again, press any key and up will come a screen asking you to enter your code. Entering the right code will take you into BASIC, ensuring the money can't take you back to the press any key screen again.

Should you forget the code, there is a useful little trick to enable you to recover your program. Follow the below instructions carefully:

1. Hold down the RUN/STOP key.
2. Press in the reset button while holding RUN/STOP.
3. When the computer prompts up, you will be in the monitor. Release RUN/STOP now!
4. Type "X" and press return.
5. You will be back in BASIC. Typing LIST and pressing return should give you your program back.

Getting it in

The Basic loader is easy to use. Just type in all as very carefully, and save it to tape or disk. Then run it. If you've made a mistake, TRYING ERROR will appear. If everything is alright, you can save the code using the following BASIC line:

```
SAVE "Diskname",B15,P484T0  
P5913
```

When you want to use the program next time, use:

```
ALOAD "Diskname"
```

```
SY5 4864
```

And then follow the instructions under "Using the Program".

And that's it



PROGRAM LOGS

```

1 SET *****
2 SET * PROGRAM NUMBER *
3 SET * END WORD *
4 SET *****
5 PRINT*****
6 PRINT***** THIS PROGRAM
  ONLY WORKS FOR THE
7 PRINT/END
8 END
9 DATA PORT/WORD IN END WORD *
  CO-ORDINATE
10 IF COORDINATE THEN PRINT THIS
  END WORD
11 PRINT/END COORDINATE END
12 PRINT/END
13 DATA 18,179,250,189,18,133
14 DATA 189,250,189,1,179,25
15 DATA 18,18,189,250,189,25

```

```

16 DATA 189,250,189,25,18,189
17 DATA 189,189,25,18,189,25
18 DATA 189,250,189,25,18,189,25
19 DATA 189,250,189,25,18,189,25
20 DATA 189,250,189,25,18,189,25
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23 DATA 189,250,189,25,18,189,25
24 DATA 189,250,189,25,18,189,25
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26 DATA 189,250,189,25,18,189,25
27 DATA 189,250,189,25,18,189,25
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96 DATA 189,250,189,25,18,189,25
97 DATA 189,250,189,25,18,189,25
98 DATA 189,250,189,25,18,189,25
99 DATA 189,250,189,25,18,189,25
100 DATA 189,250,189,25,18,189,25

```

C64 PROGRAMMING

THE USER PORT

When Commodore created the user port, they did not intend it to be used purely for RS232 communications, but instead to form a link between the computer and the outside world.

Despite the fact that there are twenty-four lines available from the user port, only ten are actually required to connect the C64 to the outside world FDB-PB7, 5v, GND.

The 5v and Ground (GND) lines can usually be used to power anything which is connected to the C64, but you must be careful not to draw more than 200mA amps because this will damage the computer.

The theory

You should already know that there are eight lines in the user port (called FDB-PB7) which are available for the use of the individual. However, to actually use these lines they must be set to either input or output (they are set to input on power up). Luckily, the Commodore operating system makes this an extremely simple process. At location 56379 there is a bit for each line. To set a line to input make the bit zero; to set a line to output the bit must be one. (If you set bit 3 to one then line PB7 will be set to output). The following example should make this easier to understand.

Hex: 76543210
Value: 01001100

Explore the possibilities
of this versatile user
port

By R. Smedley

You can see that lines 6, 3 and 2 are going to be set to output, and lines 7, 5, 4, 1 and 0 are to input. To actually achieve this configuration, the binary number, and to the value, must be translated into decimal so that it can be entered into the computer, using the 'poke' statement. The necessary calculation is as follows:

2 to the power of $6 + 3$ to the power of $3 + 2$ to the power of 2

In other words $64+8+4$ which equals 76 . Therefore, to achieve the configuration in the example we would have to **POKE 56579,76**.

Output

Now that the lines have been set, assuming some have been set to output, it becomes necessary to have a way of controlling the state of the lines (either low or high) which again is an extremely simple process. A bit has been allocated to each line at location 56577. To make a line go high you set it to zero (i.e. if you set bit 6 to 1 then line P06 will be taken to be high). You must remember not to try and output through a line set to input because this will just confuse the C64.

The following example should make this clear.

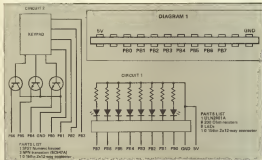
```
Bin no: 7 6 5 4 3 2 1 0
Value: 0 1 0 0 0 1 0 0
```

As you can see, lines 6 and 2 are required to go high, leaving the other lines low. Again, this binary figure must be translated into decimal. Using the same process as above we discover that the figure required is 68. Therefore the following statement must be entered:

```
PROGRAM: LINEIN 1
10 INPUT "P00-P07=";A$
20 FOR I=0 TO 7
30 IF MID(A$,I+1,1)="" THEN GOTO 10
40 IF MID(A$,I+1,1)="0" THEN
50 POKE 56577+I,0
60 ELSE POKE 56577+I,1
70 NEXT I
80 PRINT "P00-P07=";A$
90 END
```

```
PROGRAM: LINEIN 2
10 INPUT "P00-P07=";A$
20 FOR I=0 TO 7
30 IF MID(A$,I+1,1)="" THEN GOTO 10
40 IF MID(A$,I+1,1)="0" THEN
50 POKE 56577+I,0
60 ELSE POKE 56577+I,1
70 NEXT I
80 PRINT "P00-P07=";A$
90 END
```

```
PROGRAM: LINEIN 3
10 INPUT "P00-P07=";A$
20 FOR I=0 TO 7
30 IF MID(A$,I+1,1)="" THEN GOTO 10
40 IF MID(A$,I+1,1)="0" THEN
50 POKE 56577+I,0
60 ELSE POKE 56577+I,1
70 NEXT I
80 PRINT "P00-P07=";A$
90 END
```



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RIK OF THE JOURNOS



His hometown played for The World-famous Wondersmith. They were competing in the Gravelton Charity School and their time had expired out in time.



1

Then it was the Jacobson match!



3

The first semi-final was the Festival of the World as The Software Publishers.



2

His side's great, but The Journal's bigger!



Swind

The team that they beat, The Distributors, did beat the Swedish police players!



4-1

5

4

A huge throng to the
goal. The Jags in the
red of the world



Very soon, the Jags
were 2-0 ahead



Photography: Peter Marvick
Script: Pat Adamson



You may ask when TC is doing to celebrate the new football season? Well we, coupled with those wobbly chuggers (and chappies) at Empire, are giving away a football and a Tottenham shirt. But hold onto your aluminium rods, these are no ordinary Spurs goodies. They're Spurs goodies signed by the Spurs bar lad himself, Paul Gascoigne.

To get your groggy mitts on the prize (as modelled here by the delectable Maria Wade) you must answer the following three questions. To make it harder for you, we want that you do it whilst pinging on the spot.

1. From what team did Tottenham sign Paul Gascoigne?

- a) Newcastle United
- b) Millwall Lions
- c) Watlington Rodions

2. When was the last time that Tottenham won the FA Cup?

- a) When dinosaurs did roam the Earth
- b) 1981-82
- c) 1980-81

3. How tall is our Gaffer?

- a) 3' 10"
- b) As tall as Haddock tower
- c) 3' 2"

Put the answers on the back of a postcard (or sealed envelope) and send them to:

Game Compo, TC, Argo House, Boundary Way, Hatfield Hemphel, HP1 7SE.

The first correct card pulled out of the wobbly hat on 15th November 1989 will grab the shinties.

The Ever Important Big Wobbly Rules

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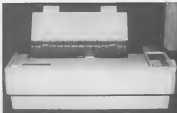
The entry restrictions form part of the rules and the Editor's decision is final (you can be guaranteed that it will be a good one though). No correspondence will be returned save in the event of a flood, we reserve the right to use a barometer.

PS No entries will be accepted if scribbled on the back of a cabinet number.

GET SHIRTY!

Could Duncan Evans be confucius? Not likely, but he has certain similarities, neither of them played full-back for Liverpool. He also runs his beadies over the new Swift 24-pin printer.

SWIFT AS A NEWT



Stavos: A rather decorative little number, don't you think?

Confucius he says, "Complain without protest is like Stone Over a Wall in the memory." Well I lie, he didn't really. I made that up. He would probably have had a printer though, I mean how else are you going to output your mind boggling philosophical discourses unless you can get a hard copy. Oh, it was easy enough to Confucius' day, you just ordered the nearest monk to start scribbling on a stick and before you could say, "The wisdom of Confucius," you were five generations down the line and your life's work was being published posthumously.

Unfortunately there aren't that many monks willing to spend their lives scribbling out the reviews for Four Commodore and also, very few monks either so in order to support myself and my football team of starving children I needed the hi-tech equivalent. Commodore Europe also realised that monks were in short supply, and that they wrote as quickly as a Commodore Printer and thus released the 128-D, a relatively cheap 9-pin printer. This combined low cost with decent performance and became the biggest selling 9-pin printer in Europe.

Fast enough, but what has that to do with the price of cheese you may ask, and quite rightly too. Well, good old Commodore, flustered by the success of the 128-D has launched something of a successor—the Swift 24, which it hopes will swamp the 24-pin market in a similar manner to the 128-D and the 9-pin market.

The Swift 24 offers the reasonably low price of £289 ex VAT and the power of a 24-pin printer, plus the convenience of no dip-switches. Interested? Then read on.

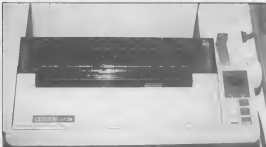
Amongst the many claims made for the Swift 24 by Commodore, is one of soundness. Okay, let's see I thought, and dropped it on the floor from a foot. Apart from the top flapping around like a fish in the sea outside Salford, the Swift was unperturbed by its flying lessons. But then again, who has their printer damaged only a foot off the floor? I used two feet, and was rewarded with an undesirable piece of plastic shattering past my ear as the shock wave set alarm bells ringing all over North London. The printer wasn't too happy with this treatment, and had to be calmed down and reassembled before it was up to printing out this article. I still don't know where that piece of plastic came from.

The Swift has a two-year warranty from Citizen, as long as they don't catch you dropping it on the floor, and the print head is guaranteed to give you 260 million dots before dying, while the rest of the moving interests will last approximately 4000 hours before ceasing to function. As long as you aren't rough with it, it should last five years with ease.

There's a tractor feed and an excellent single sheet paper feeder, and the printer is equipped with a Continuous parallel interface as standard with a serial RS232C as an optional extra.

Printing speed is another great claim in the advertising blurb, but at only 182 characters per second (at 12bps) in draft mode its performance is only average against 4-pin printers in this price range. That's the fastest it gets, you should also take into consideration 160 CPS (at 18bps) in draft, and more

Below: The Swift 36, faster than its spending paychecks!



importantly 34 CPS at 18bps and 64 CPS at 12bps in NLQ mode. The NLQ fonts are presumably why you want this printer: otherwise I assure you, you are wasting your money. An 8K buffer helps the printing process, and a memory test display tells you how much of the buffer is full of incoming data.

The default fonts are Times Roman (okay), Courier (very good), Helvetica (just well and excellent) and Pica (horrible). There is a cut away section of the printer where optional font cards can be plugged in to extend the range, and of course your software may be able to create additional fonts anyway. The dot density is 120 DPI in draft mode, and 460 DPI for NLQ and graphics modes.

Instead of ajo revolvers the Swift has a two line, eight character LCD, and eight buttons topped. This can be used to store all sorts of printer functions including character set (from UK/Japanese to Latin American), page length (text and lines per inch), printer emulation (Epson LQ24, IBM Proprinter 324 and NEC P1+), font, colour or standard ribbon, pitch (proportional and up to 28CPI), and interface options.

The control panel also allows you access to four macros, which contain predefined settings. You can redefine any of these and save them into the Swift's electrically erasable programmable read only memory (EEPROM), so that when the printer is next switched on, your settings are automatically loaded as the default.

The Citizen Swift 36 is an excellent printer offering the power of 24-pin printing, but with a low cost, considerable ease of use, a guarantee to the cost of damage the average tin sniffer upon it, and it's backed up by a two year warranty. If Confucius was alive today the Swift could have used five pennies of monk as a unit of hard work.

Duncan Evans

Below: Swift's press the button that stops death destruction and Terry Wogan.



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If you think that one of our programs looks very interesting, but you can't afford the time to type it in, then our software service will help you out

It's three o'clock in the morning. You sit at the computer keyboard having just finished a marathon typing session entering one of the superb programs from *Your Commodore*. Your fingers search for the keyboard and press the letters B, U and N. You press RETURN, sit back and nothing happens.

Everyone has probably faced this problem. When it does happen it's a waste of spending hours searching through the program for any typing mistakes. No matter how long you wait, or how many people help you, you can usually guarantee that at least one body has slipped through unnoticed.

The *Your Commodore* Software Service makes available all of the programs from each issue on both cassette and disk at a price of £5.00 for disk and £4.00 for cassette. None of the documentation for the programs is supplied with the software since it is all available in the relevant magazine. Should you not have the magazine then back issues are available from the following address:

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The Disk

Programs on the disk will also be supplied as totally working versions, i.e. when possible we will not use River London thus making use of the programs much easier. Unfortunately at the moment we cannot duplicate C16 and Plus/4 cassettes. However programs for these machines will be available on the disk.

What programs are available?

At the top of each article you will find a strip containing the article type, C64 Program etc. So that you can see which programs are available on which format, you will also find a couple of symbols after this strip. The symbols have the following meaning:



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NEON ZONE

If it's Christmas, it must be coin-ops, coin-ops and more coin-ops. Well, thank what all the major publishers decided a few years back anyway and as the gamers have responded with waggling the heads of game stuff on counters all around the country, I guess they must have been right.

You can count the home format hits over the years — *Granada, Outrun, Operation Wolf* — just three of the titles that took the silver number one spot over the festive season on consecutive years, with a whole trail of others not far behind, all riding on the back of phenomenal arcade success.

Christmas '88, *Granada*, the first four-player game ever in the arcade, '87 gave us *Outrun* the fast and loose glamorous driving game at the time and in '88 came *Op Wolf* the not particularly ideologically sound electronic shooting gallery that virtually caused a world shortage of 16p pence.

If you are an aficionado of coin-ops, you'll notice that there's a significant size gap between a machine taking the arcade themselves and appearing on home formats. The reason for this is pretty obvious. Coin-op manufacturers produce and manufacture the games to an almost finished state (there is mind the scale of the operations here — Sega alone have a workforce of 400+ people working on the next *Afterburner*), they then offer the licensee to program the game on home formats to the various software houses.

Decisions are made, deals — whereby obviously large amounts of money change hands — are struck, and then the programming must begin. Yes, some poor coin-op-brick has now got to get down to the brass tacks of fitting some 4 Meg extravaganzas into 512, 64, or if he's done something particularly nasty in a past life, 48K.

How the hell do you start doing that, you might ask yourself? Well, in some cases it's quite simple. You don't. Many of the pasteurization of games, particularly the Sega titles, work by throwing tonnes of hardware at the thing, pre-shifting loads of bytes and just (just?) shoving them up on the screen very, very fast. And you can't do that on any affordable home machine available today. So what do you do?

Some conversions become take the view that if you can't do it properly, you don't do it at all and turn each work down. Others, however, insist that there is a fair bit of death being flung around for these jobs, not to mention possible prestige, set to work on taking the original game down like a crazed plastic surgeon, so it can work on someone's home machine, also a failure.

In the days when all that was in an arcade machine was a 6800 processor, 32K or memory and a sound chip, true coin-op conversions were possible. Now, the coin-op hardware has accelerated away into the distance, way out of reach of even the high end home machines, like the Amiga. What you get now are coin-op fantasies and anyone that thinks you get the same as the original deserves to get disappointed!

Maybe that is one of the reasons that coin-ops seem to be slightly less prevalent this year than previously. *Afterburner* are at it the same as ever though. Last year it was *Afterburner* and *Jet-Type* — this year it's *Afterburn* and a very ambitious conversion of *Power Drift*.

Power Drift in particular is going to pose very, very significant problems, being a selection of bloodingly fast sports routines. Cut down the colours, take out the memory, it is really going to be the same kind of experience as the original which was primarily designed to be a cut-in. Above you around, wasn't you with our shattering double job? I think not, Bruce.

How about *US Gold*, who must be pained about failing to make the last trick with *ThunderBlade* last time around? Only Capcom rules on releases this year with a creditable version of *Strider* hitting the streets about now and *Gold's* *Chaos* coming in on the run up to December. There's a near perfect version of this on the huge Mega-Drive console, so that is certainly a possibility at the subterranean sides, but the gameplay is a bit unspectacular and too similar to the original *Chaos* in *Golden* that did so well for little way back. But maybe the players will be rushing back for more of the same.

Perhaps it's *Golden* again who say in with the best strike at the top spot, as *Chase HQ* made a good enough impression in the arcade and, although challenging to write, is basically a driving game where you can both use the opposition. Got to be a contender along with *Op Wolf* follow up, *Operation*

ARCADES ■

Christmas is coming — and that means the start of the coin-op avalanche in the shops.

John Cook takes a look back at the arcade hits this year and wonders how the hell you fit a 4 Megabyte extravaganza into 512, let alone 64K!





Thunderbolt and Cabal

But in the Dark Horse department, you have to consider *Danmaku* who'll be winning on all formats for bigger. *Hard Drive*, from Atari Games. Now this title was the first one-up to use filled polygon graphics (the *Conner Command* - not counting the weird *I-Robot* - and is a great game to boot).

Due to some dodgy programming mistakes, the coin-up hasn't got a worthwhile last frame run and the 16-bit version should come out about the same, with the 8-bit suffering from still, probably acceptable - and is trendy 3-D too. That's my tip for the tip for this Christy, for what it's worth. But what about next year? For now is the time that next year's coin-up conversion has start making their way into the arcade.

Driving games have, again, been making the arcade operators feel warm inside as the prizes drop neatly into the coin slots. The award for most intricately advanced has to go to *Winning Run* from a company called Namco. Like *Hard Drive* this one is a filled poly game but with a difference. It's fast. Very, very fast with some breathtakingly beautiful tracks, such as finding the palace of background objects up as they passed towards you. Just like a real life.

It's a race game per se, but with smart and quick opponents plus car handling you'd normally dream about. In two modes of difficulty - hard and bloody impossible - there's plenty of life in the thing, so get yourself along to an arcade and try it out now and good luck to the guy that has to put it on home format.

Next is probably the single most successful arcade company. In "I've got a hardware expanded spirit routine and I'm going to use it" approach has spawned many hits, along with some sophisticated sci-fi ones. In fact, is also its best. - *Super Monaco Grand Prix*.

SNIP is also a racing game - but with a different hood compared to something like *Winning Run*. If the latter was an elegant gymnast, *SNIP* would be Mike Tyson. The thing expresses its sheer power of volume and speed and is guaranteed to leave you breathless and wanting more! Can't see the software houses turning this one down.

Capcom has come up with a new hardware configuration called its CP System, based on a couple of super custom chips that were developed in-house.

This board can obviously do great things - *Strider* and the newer *Wilder* and *Dynasty Wars* being three of them - but the feeling is that the best is yet to come.

In the best coin-up nation, the games are becoming bigger and bigger - in game such as *Violence Fight* and *Duke* Earl's luxury comfort boat, but nothing new beyond that.

After the success of *Up Wolf* there have been many similarly inspired games, the white knuckled *Mechanical Attack* from SNE, *Cabal* and the latest, *Dynasty Wars*. The only surprising thing was that the official follow-up from Taito, the two player *Exoticism Thunderbolt* was such flop. Overall, however, 88 has established that the common or garden business used in the everyday PCB games has vastly outstripped the capability of the most popular home computers.

A simple game such as SNE's *Protections* like has so much going on, in so many colours, even that would be difficult to undertake. The pace of technological change - the one that spawned home computers and video games almost simultaneously - is so fast that in coin-up terms, the machine you bought last year, let alone five years ago, is now obsolete in arcade terms.

Which begs the question - if that is the case, what will we all be playing in five Christmases time? And as what machines? Enter stage left a *Commodore* game console, maybe? Well, whatever, keep that joystick handy, *Flower Duet*, and give those slots a bit! Until then, if you have been, is very much. With you.



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Get in on the action

FOUR GROUND

Mark Everingham is back with the concluding part of his introduction to Plus/4 Machine Language

7501 Machine Language Instruction Set

The instruction set of the 7501 processor is simply the collection of commands which the processor can understand, just like all the BASIC commands PRINT, LIST etc. What follows is a list of commands, each with its instruction length and required processor options. The action of the command is shown in symbolic form, with a brief explanation and example. All the examples can be entered into the TROMM monitor using the method explained earlier. The valid addressing modes are shown along with the listing of any of the flags of the status register altered by the command. The meaning of each addressing mode is explained in the section entitled "The 7501 Addressing Modes". The conventions below are used in the symbolic representation of the operations. In order to conserve space, only short examples have been included. Many such examples can be found in back issues of *Four Ground* or in the future *Four Ground* articles.

"b" Hex digit of number "M" - A memory (immediate) byte
 "A" The Accumulator "N" The Negative Flag
 "C" The Carry Flag "V" The Overflow Flag
 "X" The X Register "Y" The Y Register
 "Z" The Zero Flag "E" The Interrupt Enable Flag
 "I" Interrupt Enable Flag "Z" The Zero Flag

[a] ← [b] Byte (8b) move from [a] to [b]
 [a] ← [b] Byte (8b) move from [b] to [a]
 [a] Bit a (0-7) in a byte

ADC (Add With Carry)

Operation A ← M ← A, C Flags Altered N,Z,C,V

Addressing Mode ADC # 8b ADC 8b ADC 8b(X)
 ADC 8b(Y) ADC 8b(X)
 (8b,X)

Function: The ADC instruction is used to add two numbers together, using the accumulator. The operand + the setting of the carry flag (C) or 0 is added to the accumulator and the result is left in the accumulator. Any carry necessary is shifted into the carry flag. If the result is > 127 then the N flag is set. If the result is zero, Z is set. If the result is > 127 or < -128, the V flag is set. Normally prior to use, you should clear the carry flag. The example below calculates the sum of 16 and 48.

Example 6000 LDA # 16 "Load A with value 16
 CLC "Clear Carry flag for address
 ADC # 16 "Add value 48
 BSA "Return to TROMM

AND (Perform Logical AND On Accumulator)

Operation A AND M ← A Flags Altered N,Z

Addressing Mode AND # 8b AND 8b(X) AND 8b(X)
 AND AND AND
 8b(X) 8b(Y) (8b,X) (8b,Y)

Function: These two which are both set to 1 in the accumulator and in the operand are left as 1 in the result. All other bits are set to zero. If the result is "123, N is set and if the result is zero, Z is set. The example below sets alternate bits in the byte 123 to zero.

Example: 6000 LDA #1FF Load A with value 255
AND #1AA And A with value 170

Addressing Modes BRR Returns to TEDMON

ASL (Arithmetic Shift Left)

Operation: C←C, 0←0, Flags Altered: N,Z,C

Addressing Modes ASL Shifts
ASL Shifts,X ASL Shifts

Function: All the bits within either the accumulator or a memory location are shifted left. Bit 7 is shifted into the carry flag and Bit 0 is replaced with zero. The N and Z flags are set as for the AND instruction. Shifting a byte left has the effect in binary of multiplying it by two. The example below calculates 24*2.

Example: 6000 LDA #12 Load A with value 24
ASL Shift A left (*2)
ASL Shift A left (*2)
BRK Return to TEDMON

BCC (Branch if Carry Flag Clear)

Operation: Branch if C=0, Flags Altered: None

Addressing Modes BCC Shifts

Function: The BCC instruction examines the status of the carry flag and if it is set to zero, jumps to the specified address. Note that the address must be within -128 or +127 of the current address. This is automatically checked by TEDMON. The below example adds two numbers and if a carry does not occur, stores the result on the screen.

Example: 6000 LDA #A5 Load A from address A45 (Clock)
CLC Clear carry flag for addition
ADC #A6 Add value in address A46 (Clock)
BCC \$6000 If carry clear, jump to \$6000
BRK If not, return to TEDMON
STA \$C00 Carry clear - store result on screen
BRK Return to TEDMON

BCS (Branch if Carry Flag Set)

Operation: Branch if C=1, Flags Altered: None

Addressing Modes BCS Shifts

The BCS does the opposite of the BCC instruction: it sets the carry flag and if it is set, jumps to the specified address. Again, the address must be within -128 or +127 of the current address. See the example for BCC, substituting BCS for BCC. This stores the result in the screen memory if a carry did occur.

BEQ (Branch if Equal to Zero)

Operation: Branch if Z=1, Flags Altered: None

Addressing Modes BEQ Shifts

Function: The BEQ instruction jumps to the specified address if the last result set the Z flag because it was equal to zero. The example below adds the value in ED0 to the value in ED1 and if the result is zero (that is both zero) then it stores an "X" symbol on the screen.

Example: 6000 LDA ED0 Load A with value in ED0
CLC Clear carry flag for addition
ADC ED1 Add value in ED1
BEQ \$6000 If result is zero, jump to \$6000

Addressing Modes BRR Return to TEDMON
STA \$C00 Store value 0 in screen

Addressing Modes BRR Return to TEDMON

BIT (Test Bits in Memory)

Operation: [7] of M ← N, [6] of M ← V, Flags Altered: N,Z,V,A and M←Z

Addressing Modes BIT Shifts BIT Shifts

Function: The BIT instruction tests the bits of a memory location against the value in the accumulator. Bit 7 of the memory value is transferred to N and Bit 6 to Z. If the result of ANDing A with the memory location is zero, the Z flag is set. Neither the value in the accumulator or in the memory location are changed. The example below looks at the first character on the screen and if it is reversed, replaces it with a space.

Example: 6000 BIT \$C00 Test bits of value on screen
BMI \$6000 If character is reversed, jump to \$6000
BRK Not reversed - return to TEDMON
LDA #120 Load A with space character
STA \$C00 Store space character on screen
BRK Return to TEDMON

BMI (Branch On Minus)

Operation: Branch if N=1, Flags Altered: None

Addressing Modes BMI Shifts

Function: The BMI instruction tests the setting of the N (minus) flag and if it is set, jumps to the specified address. The N flag is set by other instructions where the resultant byte is > 127 (bit 7 set). As for all other branches, the destination address must be within -128 or +127 of the current address. The example below counts from 128 to 254 in steps of two in the accumulator.

Example: 6000 LDA #120 Load A with value 120
CLC Clear carry for addition
ADC #2 Add 2 to accumulator
BMI \$6000 If result > 127 jump to \$6000 (Clock)
BRK Return to TEDMON

BNE (Branch if Not Equal to Zero)

Operation: Branch if Z=0, Flags Altered: None

Addressing Modes BNE Shifts

Function: The BNE instruction does the opposite of the BEQ command, performing a jump if the last result was

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not zero. See the example for BRQ, replacing BRQ with BKE.

BRE (Break Interrupt)

Operation	PC ← Stack, SR ← Stack, I ← 0	Flags	None
		Altered	

Function: The BRE instruction, which needs no operand, forces a Break interrupt to occur. On the Plus/4, this causes control to be transferred to TEDMON. In fact, the instruction jumps to the address found in \$0006 like a JMP (\$0016) command. The PC and SR settings before the command may be pulled off the stack using PLA.

BVC (Branch if Overflow Flag Clear)

Operation	Branch if V=0	Flags	None
-----------	---------------	-------	------

Addressing Mode: BVC Shifts

Function: The BVC instruction tests the status of the V flag in the status register and if it is clear (no overflow has occurred), does a jump to the specified address. There is no equivalent BVS instruction. The example loops until Bit 0 of the value in \$A3 (Clock) is set.

```
Example 6000 BIT $D0      'Test bits of value in $D0
        BVC $0000        'Overflow (Bit 0) clear - loop
                           'to $0000
        BRE 'Overflow set - Return to TEDMON
```

CLC (Clear Carry Flag)

Operation	0 ← C	Flags	Altered	C
-----------	-------	-------	---------	---

Function: The CLC instruction, which requires no operand, clears the value in the carry flag of the status register to zero. This is most useful in preparation for an ADC instruction—see any of the examples using ADC for a demonstration.

CLD (Clear Decimal Mode)

Operation	0 ← D	Flags	Altered	D
-----------	-------	-------	---------	---

Function: The CLD instruction resets the D flag to zero, taking the Plus/4 out of decimal mode back into standard binary arithmetic. For an explanation of the decimal mode, see the SED instruction.

CLI (Clear Interrupt Disable Flag)

Operation	0 ← I	Flags	Altered	I
-----------	-------	-------	---------	---

Function: The CLI instruction clears the I flag, and thus enables IRQ interrupts. No other flag is affected. For an explanation of interrupts, see the relevant sections.

CLV (Clear Overflow Flag)

Operation	0 ← V	Flags	Altered	V
-----------	-------	-------	---------	---

Function: The CLV instruction simply resets the overflow flag of the SR to zero. Although this is not of any use for arithmetic operations, it can be used to produce a JMP effect using a CLV followed by a JMP. The use of this is that with a conditional two work when it is placed anywhere in memory whereas a JMP instruction will only work in the address for which it was intended. The example below is equivalent to JMP \$0010.

```
Example 6000 CLV          'Clear the Overflow Flag
        BVC $0000        'Branch to $0000
```

Operation	CMF (Compare Value Against Accumulator)	No Effect	Flags	Altered	N,Z,C
-----------	---	-----------	-------	---------	-------

Addressing Modes	CMF # \$n	CMF \$n	CMF \$n,X	CMF \$n,\$n
	CMF \$n	CMF \$n,X	CMF \$n,X	CMF \$n,X
	\$n,\$n,X	\$n,\$n,Y	(\$n,X)	(\$n),Y

Function: The CMF instruction is used to compare a value with the accumulator in order to find which is larger, smaller, or if they are the same. The bits of the status flag are set then:

```
IF A < Value THEN N=1, Z=0, C=0
IF A = Value THEN N=0, Z=1, C=1
IF A > Value THEN N=0, Z=0, C=1
```

Combinations of these values are also possible, for instance just testing C shows that A is greater than or equal to the operand value. Once the CMF instruction has been carried out, you can test the settings of the flags and perform a branch accordingly. The example adds three to the accumulator until the result reaches 100.

```
Example 6000 LDA # $00    'Load A with value 0
        CLC              'Clear carry flag for addition
        DEC # $00        'Add value 1 to accumulator
        CMF # $100       'Compare A to value 100
        BCC $0000        'If A < $100 jump to $0000
        BRE 'value >= 100 - return to TEDMON
```

CPX (Compare Value Against X)

Operation	No Effect	Flags	Altered	N,Z,C
-----------	-----------	-------	---------	-------

Addressing Modes	CPX # \$n	CPX \$n	CPX \$n,\$n
------------------	-----------	---------	-------------

Function: The CPX instruction performs an identical operation to CMP except that the comparison takes place between the X register and the specified operand value. The settings of the flags are identical to those for CMP.

CPY (Compare Value Against Y)

Operation	No Effect	Flags	Altered	N,Z,C
-----------	-----------	-------	---------	-------

Addressing Modes	CPY # \$n	CPY \$n	CPY \$n,\$n
------------------	-----------	---------	-------------

Function: The CPY instruction performs an identical operation to CMP except that the comparison takes place between the Y register and the specified operand value. The settings of the flags are identical to those for CMP.

DEC (Decrement Memory)

Operation	M-1 ← M	Flags	Altered	N,Z
-----------	---------	-------	---------	-----

Addressing Modes	\$n	DEC \$n,X	DEC \$n,\$n	DEC \$n,\$n,X
------------------	-----	-----------	-------------	---------------

Function: The DEC instruction is used to decrement the value stored in a memory location by 1, as if you had subtracted one from it. The result of the decrement is stored back in the source location. If the value is decremented past zero it becomes 255. The N flag is set if the result is > 127, and the Z flag set if the result after the decrement is zero. The instruction does not set the carry flag like ADC and SBC. The example below decrements the border colour until it becomes black (value 0).

Example: 6000 DEC SFF15 'Decrement border colour in SFF15
 BNE S6000 'If result < 0 jump to S6000
 BRK 'Result = 0 - Return to TEDMON

DEX (Decrement X)

Operation: $X-1 \rightarrow X$ Flags Altered: N,Z

Function: The DEX instruction decrements the value currently in the X register by one and returns it to the X register. As for DEC, if the result goes below zero, it becomes 255. The N and Z flags are set in the same way as by the DEC command. The example below uses the DEX instruction to provide short points in the running of a program.

Example: 6000 LDN # 0 'Load X with initial value 0
 DEX 'Decrement value in X
 BNE S6000 'If result < 0 jump to S6000
 BRK 'Return = 0 - return to TEDMON

DEY (Decrement Y)

Operation: $Y-1 \rightarrow Y$ Flags Altered: N,Z

Function: The DEY instruction performs an identical action to DEX except that it operates on the Y index register. The example program for DEX will work equally well if LDN and DEX are replaced by LDY and DEY. Settings of flags are as for DEX.

EDR (Performs Exclusive-Or (Xor) Accumulator)

Operation: $A \text{ XOR } M \rightarrow A$ Flags Altered: N,Z

Function: These bits that are set to one in either the accumulator or the specified operand are set to zero. Those bits which are both one in accumulator and operand are set to zero. Those bits which are set to one in both accumulator and operand are set to zero. The resultant bits are left in the accumulator. If the result is > 127, N is set, and if the result is zero, Z is set. The EOR instruction has the effect of toggling bits in a byte.

INC (Increment Memory)

Operation: $M+1 \rightarrow M$ Flags Altered: N,Z

Addressing Modes: INC Sbb,X INC Sbbh INC Sbbh,X

Function: The INC instruction does the opposite of the DEC instruction, adding one to the value stored in a specified memory location. The result after the incrementation is stored back in the source location. If the value is incremented past 255, it returns to zero. The N flag is set if the result is > 127, and the Z flag if the result is zero. The example below increments the border colour until it goes past 255 back to 0 (black).

Example: 6000 INC SFF15 'Increment border colour in SFF15
 BNE S6000 'If result < 0 jump to S6000
 BRK 'Result = 0 - return to TEDMON

INX (Increment X)

Operation: $X+1 \rightarrow X$ Flags Altered: N,Z

Function: The INX instruction performs the same operation as INC except that it increments the X register rather than a memory location. The operation and flag settings other than this are identical to INC. The example below

increments the value originally in the X register until it reaches 192.

Example: 6000 INX 'Increment value in X register
 CPX # 192 'Compare value in X to 192
 BNE S6000 'If X < 192 jump to S6000
 BRK 'X = 192 - return to TEDMON

JMP (Jump To Location)

Operation: $M \rightarrow PC$ Flags Altered: None

Function: The JMP instruction is used to change program flow to a specified address, like the BASIC GOTO command. None of the flag or register settings are changed. The jump is unconditional and is not limited to the -128, +127 range imposed on branch instructions. The example below just jumps back to itself for ever.

Example: 6000 JMP S6000 'Jump unconditionally to S6000

JSR (Jump To Sub-Routine)

Operation: $PC+2 \rightarrow \text{Stack}, M \rightarrow PC$ Flags Altered: None

Addressing Modes: JSR Sbbh

Function: The JSR instruction is equivalent to the GOSUB command in BASIC. First the address to which control must return after the sub-routine is pushed onto the stack, and then a jump is carried out to the specified absolute address. When a subsequent RTS is found, the return address is pulled back off the stack and jumped to. The example below calls a short routine to increment the border colour, then ends.

Example: 6000 JSR S6000 'Jump to sub-routine at S6000
 BRK 'Return to TEDMON
 INC SFF15 'Sub-routine - increments border colour
 RTS 'Return from sub-routine

LDA (Load Accumulator)

Operation: $M \rightarrow A$ Flags Altered: N,Z and ZS and overflow

Example: 6000 LDA SFF15 'Load A with background colour in SFF15
 LDR # SFF 'Toggle every bit in bits
 STA SFF15 'Store back in background colour
 JMP S6000 'Loop back to start

Addressing Modes:

LDA # Sbb LDA Sbb LDA Sbb,X LDA Sbb,X
 LDA Sbbh LDA Sbbh,X LDA Sbbh,X
 LDA (Sbb,X) LDA (Sbbh,Y)

Function: The LDA instruction is used to transfer a value to the accumulator. The specified operand value is loaded into the accumulator. The N flag is set if the value is > 127, and Z is set if the value is zero. The source value is not affected. For examples, see any of the example programs using the instruction.

LDR (Load X)

Operation: $M \rightarrow X$ Flags Altered: N,Z

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Addressing Modes

LDX #Shb	LDX Shb	LDX Shb,Y
LDX Shb#b	LDA Shb#b,Y	

Function: The LDX instruction is identical in use to LDA, but the specified value is loaded into the X register.

LDY (Load Y)

Operation	M ← Y	Flags Altered	N,Z
-----------	-------	---------------	-----

Addressing Modes

LDY #Shb	LDY Shb	LDY Shb,X
LDY Shb#b	LDA Shb#b,X	

Function: The LDY instruction is identical in use to LDA, but the specified value is loaded into the Y index register.

LSR (Logical Shift Right)

Operation	0 ← [7-0] ← C	Flags Altered	N,Z,C
-----------	---------------	---------------	-------

Addressing Modes

LSR	LSR	LSR	LSR
Shb	Shb,X	Shb#b	Shb#b,X

Function: The LSR instruction performs the opposite of the ASL instruction. All the bits within the accumulator or memory location are shifted to the right. Bit 0 falls out into the carry flag and bit 7 is replaced with zero. This has the effect of dividing a number by two with the binary carry bit being left in the carry flag. The example below calculates 102/8.

Example: 6000 LDA #C0 'Load A with value 192
 LSR 'Shift A right (1/2)
 LSR 'Shift A right (1/2)
 LSR 'Shift A right (1/2)
 RRR 'Return to TEDMON

NOP (No Operation)

Operation	None	Flags Altered	None
-----------	------	---------------	------

Function: The NOP instruction simply does nothing—it does not affect any register or flag and creates a time delay of 1 clock cycles. The instruction is often used either to give a space between sections of a program or to replace other instructions during debugging.

ORA (Perform Logical OR)

Operation	A OR M ← A	Flags Altered	N,Z
-----------	------------	---------------	-----

Addressing Modes

ORA #Shb	ORA Shb	ORA Shb,X	ORA Shb#b
ORA Shb#b	ORA Shb#b	ORA Shb#b,X	ORA Shb#b,Y

Function: All the bits which are set to zero in both accumulator and operand byte are set to zero. All bits which are set to one in either in both of the accumulator and operand are set to one. The result is left in the accumulator. The N and Z flags are set as for the AND instruction. The example below sets bit 7 of the character at the start of the string, so removing it.

Example: 6000 LDA #C000 'Load accumulator from address 6000
 ORA #100 'Set bit 7 (OR with value 128)
 STA #C000 'Store byte to address 6000
 RRR 'Return to TEDMON

PBA (Push Accumulator onto Stack)

Operation	A → Stack	Flags Altered	None
-----------	-----------	---------------	------

Function: The PBA instruction is used to push the value currently in the accumulator onto the stack. Once there, it can be pulled back into the accumulator using PLA. For information on the stack, see the relevant section. The example below sets a push and then pull to set up the status register flags.

Example: 6000 PBA 'Push value in accumulator onto stack

PLA 'Pull value back of stack & set flags
 RRR 'Return to TEDMON

PHP (Push Processor Status Register onto Stack)

Operation	SR → Stack	Flags Altered	None
-----------	------------	---------------	------

Function: The PHP instruction does the same as the PBA instruction except that it is the status register which is pushed onto the stack rather than the accumulator. This is useful for two purposes: retaining the status register when calling a sub-routine and examining the status register by pushing PHP and pulling PLA.

PLA (Pull Accumulator From Stack)

Operation	Stack → A	Flags Altered	N,Z
-----------	-----------	---------------	-----

Function: The PLA instruction pulls a value off the stack into the accumulator previously pushed on using the PBA instruction. The N and Z flags are set in accordance with the manner for the LDA instruction. For an example, see PBA.

ROR (Rotate Right)

Operation	C ← [7-0] ← C	Flags Altered	N,Z,C
-----------	---------------	---------------	-------

Addressing Modes

ROR	ROR Shb	ROR Shb,X	ROR Shb#b
ROR			

Function: Bit 7 of the accumulator or memory location is shifted into the carry flag. Bit 0 through 6 are shifted left one bit, and the carry flag before the operation is shifted into bit 0. The result is left either in the accumulator or in the memory location specified. If the result is > 127, N is set and if the result is zero, Z is set. The example below uses ROR and ASL to multiply a 16-bit number by two. The low byte (SHLL) is stored in SHD and the high byte (SHH) in HCD.

Example: 6000 ASL SHD 'Shift low byte in SHD left (*2)
 ROR HCD 'Rotate high byte + carry left (*2)
 RRR 'Return to TEDMON

ROR (Rotate Right)

Operation	C ← [7-0] ← C	Flags Altered	N,Z,C
-----------	---------------	---------------	-------

Function: The ROR instruction does the opposite of ROL. Bit 0 is shifted into the carry flag. Bits 6 through 1 are shifted right one bit, and bit 7 is replaced by the carry flag prior to the operation. This can be used in conjunction with LSR to perform two-byte division by two. The example below divides the 16-bit value in HD (low) and ED (high) by two.

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the actual number in the contents of the address specified and not the address itself.

Implied Mode With implied mode, no operand is specified in a command like TZA or PHA, the location of the data byte is implied by the command. Also, commands like ASL or ROL can be used implied because containing the operand advances the accumulator to the data location.

Immediate Mode [+Snn] In immediate mode, you specify the byte number directly rather than as an address. **Absolute Mode** [Snnnn] In absolute mode, you simply specify an address of a memory location in the range 0-65535. The byte operand is then defined as the contents of the location you have specified.

Zero Page Mode [Snn] Zero page mode is identical to absolute mode except that the address you specify can only be between 0 and 255. The advantage of using this mode is that it is faster, and because the operand is 1-bit instead of 16-bit, the command takes up one byte less than when using absolute mode.

Relative Mode Relative mode is that used for all branch instructions. The idea is that instead of specifying an absolute address, you provide an offset which is added to the current address to find the destination. The programmer never has to worry about how this offset is calculated as TEDMON does the calculation for you.

Indirect Mode [Snnnn,X] Indirect mode can only be used by one command, the JMP instruction. The 7500 looks at the absolute address you specify, and gets its jump address from there. The final address is stored with four bytes (Snnnn,X) as the location specified, and the high byte (Snnnn) is the start location of:

Absolute Indirect Mode [Snnnn,X] (Snnnn,X) Absolute indirect mode calculates the address from which to get a byte by adding the value stored in the index register you specify to the base address. Thus if X = not 0, 34, LDA S1280,X would get a byte from the address 61234.

Zero Page Indirect Mode [Snn,X] (Snn,X) Zero Page indirect addressing is the same as absolute indirect except that the base address can be between 0 and 255 instead of 0 and 65535. The advantage is speed and compactness.

Indirect Indirect Mode [Snnnn,X] Indirect indirect mode, sometimes called post-indexed indirect mode is a little more complex. The address Snn is a zero page address (0-255). The base address is found in Snn (low byte) and Snn+1 (high byte). From there on, the mode works like absolute indirect mode. Snnnn,X with Snnnn being the address found in Snn in zero page. The X register is added to the address to give the final address.

Indirect Indirect Mode [Snn,X] Indirect indirect mode, sometimes called pre-indexed indirect mode is a little stronger. The address location is calculated there. The zero page address Snn is added to the value in X. A base address is then loaded from the zero page address Snn+X, and this forms the final 16-bit address. The mode seems of limited value, and I have never myself seen a program on any 7500-type processor using the mode!

Plus/4 ROM/RAM Paging Considerations For Data Transfer

Most computers, such as the BBC, have only one memory map. That is to say that RAM extends from 00000-0FFFF and ROM from 00000-0FFFF. The Plus/4 however is more flexible than that. It has RAM from 00000-0FFFF, but the area from 00000 onwards can either be RAM or ROM, giving the computer a full 64K of RAM. You can choose to have ROM at 00000 by doing a STA

0FFFF, and ROM by doing a STA 0FFFF. All LDA, JSR, etc. operations work on the current type of memory, ROM or RAM. Note that when using RAM at 00000 onwards, you must disable interrupts first. The two programs below would appear at first to do the same thing, but the first loads the accumulator with a byte from ROM and the second from RAM, by using the STA instruction to page RAM or ROM in.

```
Program 1  SET
            STA 0FFFF
            LDA 00000
            STA 0FFFF
            CLI
            BRK
```

```
Program 2  SET
            STA 0FFFF
            LDA 00000
            STA 0FFFF
            CLI
            BRK
```

The simple method of choosing between ROM and RAM configurations makes the Plus/4 far more powerful than standard single memory map computers.

An Introduction To Plus/4 7500 Interrupts

Interrupts seem to frighten many people, but are really nothing to fear. Interrupts are just what they sound like "interrupts". You can program your Plus/4 to do that whenever a specific event occurs, an interrupt to the main program which is running, and note "Hang on a moment, I'm sorry to interrupt but I've got something important to do now so you'll have to wait until I've finished." Your program, called the interrupt handler can then do whatever it wants, then it returns control back to the main program which continues running as if nothing had happened.

There are several different events which can be used to generate interrupts, but here we will consider only the simplest: what are called timer interrupts. Normally, interrupts are used on the Plus/4 to keep the screen clock read by TI and TB running. Every time the screen on your TV or monitor is redrawn, an interrupt is generated. That occurs every 50th of a second in the UK. When the interrupt is generated, a JMP instruction is done: JMP (\$0014), \$0014 being a 'vector' containing the address at which an interrupt handler can be found. Thus, a routine in the ROM of your Plus/4 updates the clock, scans the keyboard and does miscellaneous other work. This means that you can get your own program to run at the same time as Basic, by changing the address stored in \$0014. The program below sets up interrupts to then every 50th of a second, the border colour is incremented.

```
0000 SET      'Disable interrupts for setup
            LDA # 000
            STA $0014 'Start low byte of interrupt vector
            LDA # 000 'Load a with high byte of 0000
            STA $0015 'Store high byte in interrupt vector
            CLI    'Re-enable interrupts
            RTS    'Return to BASIC
            PHP    'Interrupt Handler: Push SR to stack
            INC $FF10 'Increment border colour
            PLP    'Pull SR back off stack
            JMP $C000 'Return to ROM interrupt handler
The program can be entered into TEDMON and then
```


MAIL BAG

Put pen to paper and tell us your news, views and groans

Dear TC

I feel that I must write and express my views.

I purchased a C16 in 1984 and enjoyed the scope of that machine so much that the following year I bought a Plus4 and am still impressed by its capabilities.

However, things might have been different if I had known at the time that both of these machines were only a stop-gap until the C128 and Amiga were developed more.

Although I am satisfied with the Plus4, the software manufacturers appear not to be support for the machine has been poor. It is picking up slowly now but the demand will never be as great as for the C64, because it lacks the machine game.

So, why not help all those C16 and Plus4 owners and compile a C16-Plus4 edition of *Your Commodore*, you already have the material to hand, as like not co-cycle and up-date a selection of articles from the last five years' magazines. Your range of material must be vast, therefore the edition would appeal to all levels of operators.

Perhaps if you did run such an edition, you might influence some software manufacturers to think, again — not such a bad idea!

K. Williams, 62 Yarmouth, Norfolk

paper which leaves it with you. The Plus4 is a very much underrated machine.

However, you cannot simply just produce a one-off magazine like this every 20 issues. In fact, we have already published the 'Your Commodore C16 and Plus4 technical guide' back in 1984. On top of that, we have to date got no less than 3 disks of Plus4 software available through our Readers Service department. The fact of the matter is this: like any other computers, companies and computer software rely on supply and demand. I think that the following will clarify this a bit more.

At the moment, I have 174 readers subscriptions as a long publication. This figure can be broken down as follows:

C64 - 147 C128 - 4 Amiga - 1 Plus4 - 2 (C16 is not)

Dear VC

Could you, through your letters pages, please help me solve one of life's great mysteries?

I have been searching the far land of corn for some 11 months now, for a copy of the instruction manual for the Currah Speech Cartridge. Unfortunately, my efforts have proved fruitless. I am turning to you as a last resort. Could you please publish my plea for any help in this matter. Thank you.

Ken Cole, 33 Randolph House, Roseberry Street, London SE16 1NE

Thanks for the letter. Here you

Come on now you let out there, someone must be able to help our Ken. Any help would be most appreciated. Please send all replies direct to Ken and not to Your Correspondent. Thank you

Dear VC

The reason for this letter is simple. I am a dedicated C16-Plus/d user. Therefore, I have started a C16-Plus/d club. The club intends to produce a monthly magazine which will include Program listings, Tips, News, Prices and Reviews.

If there are any C16-Plus/d owners that would like to join the club they can write to me at the address below for details. I would like to add that any C16-Plus/d owner can join, no matter what age, sex, level of competence you are.

R. Robinson, 112 Cliff Road, Hornsea, North Humberside, HU18 1AE

Thanks for your letter. It is sure to be that someone is actually doing something positive for a change. Good luck with the venture

Dear VC

I was interested to read your review article about the LC-80C colour printer. I purchased one about a month ago. On arrival, a small part of the maintenance key system was distorted, which was of course no matter to the control or print output. But after 3-4 colour printouts, two less drops in colour, then 3-9 and even (in black), in NLQ, the NLQ failed to below draft quality? I therefore phoned Star and spoke to someone that sounded like a young girl assistant. I do not think she understood what I explained to her. I later spoke to someone that appeared to be more technically minded. We both agreed that the ribbon should last for more than three or four printouts at NLQ, this was at 11:10 in the morning. At 11:45 the next morning a replacement colour ribbon arrived by post. How's that for excellent after sales service? (11 out of 10 in Star)

I wrote back with my thanks, and the following suggestions:

1. The clear part of the plastic cover should be removable in addition to the rest of the plastic cover. This lets one see the print as it is made.

2. As far as I know, only fanfold paper can be scrolled back by the printer, to the top of the page. Single sheets do not obey the command. It should be made possible for single sheets.

3. I found out that if one pulls the release lever to see the 'back' the single sheet with the first sheet of fanfold paper, then the command for the printer to return both the single sheet together with the first sheet of the fanfold paper does work. The fanfold sheet is the first of several sheets of the fanfold stack. The purpose of all that? One can print on more detailed graphics to pin detail.

J. Bradley, Larnachkie, Scotland

Thank you for your comments regarding the review. I have tried your suggestion regarding the scrolling and it does appear to work just fine. Thanks for the tips.

All your C128 problems
answered by resident
boffin Stuart Cooke.

Cry for help

Dear 128 Corner,
I wonder if you or any of your readers can help me. When using my 128 in CP/M mode I am unable to display the Pound sterling sign on either the Screen or the printer.

On pressing the POUND key I get a Hash sign (#) displayed instead. Just as if I had pressed the Hash key.

If you can solve this problem it would make life easier for me as at the moment when in CP/M I have to type Pounds sterling.

I use a Wordprocessor called VIDE8 which I obtained from the Public Domain. (I am writing this with it) which I think is very good, but would be even better if I could use the POUND sign.

I would also like to know if it is possible to change the Character colour from purple on leaving CP/M. Can I change the colour from within a profile sub file, as I have put this file on my CP/M boot disk so as to set out the Date and time on leaving CP/M.

Your Commodore is a brilliant Mag for Commodore users and the 128 Corner is a great idea, its encouraged me to write to you, and I hope you are able to keep it going.

Steve Thomas,
Barnsley

After much experimenting in the office I'm afraid that we've come up with a blank regarding your pound sign. You can alter the keypad using the KEYDEF program that is on your system disk to alter the code that any key on the keyboard gives. All we can suggest is that you change the character code that is assigned to the pound key to the same code that your printer expects for this character. You may find that the character does not appear as a pound on the screen, chances are it will be a hash hash, but as long as your printer is set up to print a pound you should have no problems. See your printer manual for details on the code to use for a pound sign.

The same program KEYDEF can be used to set the screen colours upon boot up. Don't make changes to the system disk supplied with your C128, make them on a copy of it. KEYDEF has quite a large help file associated with it so you should have no problems using it.

If anyone knows of a better way to allow Mr Thomas to have a pound sign please let us know.

Glad to hear that you like the mag and C128 Corner. Remember keep writing to with any tips, hints, views on software and general queries and we'll do our best to keep this page both topical and informative.

Video Memory Expansion

Dear 128 Corner,
In the July issue of Your Commodore you mentioned the video memory expansion from EROM that bumps the video memory of the VIC up to 64 K and you said that you didn't know an order company that sells such an expansion.

There is a company in Switzerland that sells such an expansion and also a special Base that supports the new memory. With the Base you will be able to reach a resolution of 768x720 pixels.

The program is called Graphics Booster and it is available with the memory expansion for the C128/D in the plastic case and without the expansion for the C128 D in the metal case. Contact Comibo AG, Tuggenweg 3, CH-4500 Solothurn, Switzerland.

F Biss
Ingeltingen
W Germany

It's good to see that Your Commodore reaches parts that other computer mags cannot reach!

Thanks for the info on the Swedish company other readers may wish to contact them directly at the address quoted. I have written to the company myself and will let you know through these pages about prices and any other C128 goodies that they may have available as soon as I get a reply.

128 CORNER

18 into I won't go

Dear 128 Corner,

I have just read your article *C128 Corner* in the recent edition of *Your Commodore* and must congratulate you upon taking the initiative to set up a regular page for C128 users.

I have been a Commodore fan for a number of years, and earlier this year decided to upgrade from the old faithful C64 which had served its purpose well but was restricted to its limits. Although the Amiga and PC clones looked very attractive, the initial outlay for both hardware and software was prohibitive¹ so the C128D was bought, and C64 sold, the prospect of under horizons for myself, and lots of old C64 software to keep the kids happy. Then the bubble burst — where was all the software and support for this machine — oh dear I've bought a dud!! or so.

However I can now say how pleased I am with the C128D, with real wordprocessing courtesy of *Superscript*, and a machine which can offer the budding programmer 3 processors to play with. I have progressed now to the stage of writing small Z80 routines in 128 mode and translating them over into CP/M, and feel that the opportunities for learning are once again wide open. OK my pals with the PC clones can still boast massive memories, terrific speeds, and huge cost for software², but many admit when having seen the C128 in action that its performance and results are virtually as good, but the C128 is far more versatile and offers the learner far more scope.

It is beyond the bounds of possibility for an MS-DOS machine to be constructed with the Z88, or is it exclusive to the 16 bit machines? I have looked at a few MS-DOS books for hints on how the system is put together but all that I can find is user instructions — so sorry guys!! Does anyone have any thoughts on this??

I have used CP/M software from Digital which has been written for a Rainbow computer but the 1571 is unable to read the discs, should I be looking at modifying the disk parameter table or am I expecting the impossible here?? any hints??

I will certainly do my best to keep the comments flowing in to support C128 corner, and I hope many of my fellow C128 users will do the same. Well done to YOUR COMMODORE!! and thanks for your support.

Chris Allen

Leam Valley

Glad to hear that you're a C128 fan. My Allen. Here at this office we still think that much of the software written for the C128 is far superior to that written for the 16-bit machines like the PC or Amiga. If you're into using CP/M why not get writing on such topics and articles as I'm sure that CP/M is an ability of the C128 that most users never use.

I'm afraid that MSDOS is designed for 16-bit computers and I'm like the C128 and you'll not be able to run MSDOS on your machine. :-)

As for your problem running CP/M software for the AmigaOS. There are two versions of CP/M at hand. One that an old C128 is designed for 8-bit computers the other is for 16-bit machines. You can't run software specially for 16-bit machines on your C128, you sort of course use high-level language of software written for 8-bit CP/M.

Get in Touch

C128 Corner is a forum for all 128 stuff. If you have any comments, suggestions or questions do send them in. Whether your computer is the 128 Corner will not be able to contain. So come on, write to

128 Corner

Your Commodore

Argus House

Beaconsfield Way

Brentford, Hants

Berni

BF2 7ST

THE END IS NIGH

Bribe of the Month



The big wobbly jelly spider
- Virgin Mastertronic

Christmas is coming



Ad Manager in brain swap shock

Paul Kavanagh, Ad Manager on your big wobbly VC, recently undertook a painful operation which would have been trying to perform for years. He volunteered to have his brain swapped with that of a new born clamp, when asked if it was a success he replied "Ooooo! Ooooo! Ooooo!" Follow up! members have noticed a dramatic improvement.

Reader participation

Anybody discovers a small Commodore computer related news item, or joke that they think would fit a page of this column, send it in and we'll name a prize for every one printed. Be careful though, we don't want anything that may mean us UP to gutter level.

Gazza signs for wrong game

Paul Gasqager was obviously confused at the recent prize launch in aid of his new game. He performed a photo shoot in what we might call a "half" business costume for the above photographs that ensued. This was rather a very clever play by Queen columnist Gary Freedy, or he was modelling next year's Tottenham strip. I leave which nation is playing for



Freddy finally killed off

Mr! Mr! US Gold does what no American teenager could, it has eliminated the master of dreams himself, Freddy Krueger. Although we had planned a large feature on Mr. Pissface, we have been informed that the computer game has been scrapped and there are no plans to resurrect it in the future. Mr. Dren now can take the mask off now. What do you mean "what mask?"



The Computer Industry Karma Sutra



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